MAY, 1941

ELECTRICAL SOUTH

UNIVERSITY OF FLORIDA

HUNTER engineers have just solved another important ventilating problem for discriminating Biltmore guests. • Two whole floors in this exclusive hotel are now equipped with HUNTER Zephair units. • This is the system of natural air cooling now adopted by many careful property owners who will accept only the best.

HUNTER FAN & VENTILATING CO., INC.

Factory: FULTON, N. Y.
General Sales Offices: Memphis, Sterick Bldg.
Eastern Sales Office: New York, 92 Warren Street
Western Sales Office: St. Louis, 1804 Pine Street
Sales Offices:

ATLANTA	DALLAS	LOS ANGELES
BOSTON	DETROIT	NEW ORLEANS
CHICAGO	HOUSTON	PHILADELPHIA
CLEVELAND	KANSAS CITY	PITTSBURGH
	ST. LOUIS	

ATLANTA BILTMORE HOTEL
ATLANTA GA

A SPECIALTY
★Even though we make a huge tonnage of Buckeye Conduit, we've never outgrown the habit of considering it a specialty. That means the men who actually make Buckeye Conduit know a great deal about how you use it. Knowledge like this, plus the skill and pride of these men, plus good equipment is responsible for the high quality and wide acceptance of Youngstown Buckeye Conduit.
★ ★ ★
Ask your distributor for Youngstown Conduit - Pipe and Tubular Products - Sheets - Plates - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes.
26-17D
BUCKEYE
YOUNGSTOWN
CONDUIT
THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steels
General Offices - YOUNGSTOWN, OHIO

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Volume 21 Number 5.

DON'T BE PUZZLED!

HERE ARE SIMPLE FACTS ABOUT WIRE DESIGNATIONS IN THE NEW N. E. CODE

Far greater flexibility and increased safety of electrical installations in conformity with modern electrical service standards are now possible because of the recognition and approval of new grades of building wire by the National Electrical Code in its 1940 Edition.

Select the grades you need from this list:

HAZACODE Type R—(Rubber-insulated. Limited to 50° C. operation) meets all requirements for "code" wire installations.

HAZARD WATERTITE Type RW—(Rubber-insulated, Water-resistant. Limited to 50° C. operation) Approved for use in wet locations where it formerly was necessary to use lead covered wire.

You can often make Large Savings with this Wire

HAZARD PERFORMANCE Type RP—(Rubber-insulated Performance grade — similar to former 30% grade. Permitted for operation at 60° C.) The higher operating temperature permits heavier current loadings or allows use of a smaller size conductor for a given loading.

This Wire will Save Copper on many jobs

HAZARD PERFORMITE Type RH—(Rubber-insulated, Heat-resistant. A new grade permitted for 75° C. operation) Has been used on a large scale under Federal Government Specs. J-C-106 and J-C-121. Permitted for general use—Higher operating temperature permits greater current loading or makes possible use of smaller conductors for same loading. Superior qualities make it advisable to select this wire for a wide range of normal uses and for hot locations, boiler rooms, steam tunnels, etc.

Performite should be used on all jobs of a Permanent Nature

HAZARD PERFORMITE Type RHT—(Rubber-insulated, Heat-resistant, Thin Wall) Also approved for 75° C. operating temperature in sizes 14-8 inclusive. Type RHT has a smaller diameter than code wires. Approved for new wiring or rewiring.

See Code Tables for Copper Saving Possibilities

HAZAKROME TYPE SN (SN—Synthetic Insulation—a new grade. Approved for rewiring in existing raceways only) Hazakrome is non-inflammable, has long life, is heat, moisture, chemical and oil resistant. Is much smaller in diameter than comparable code grades. Solves many problems concerned with modernizing electrical facilities inexpensively.

Hazakrome can open a huge Rewiring market for you

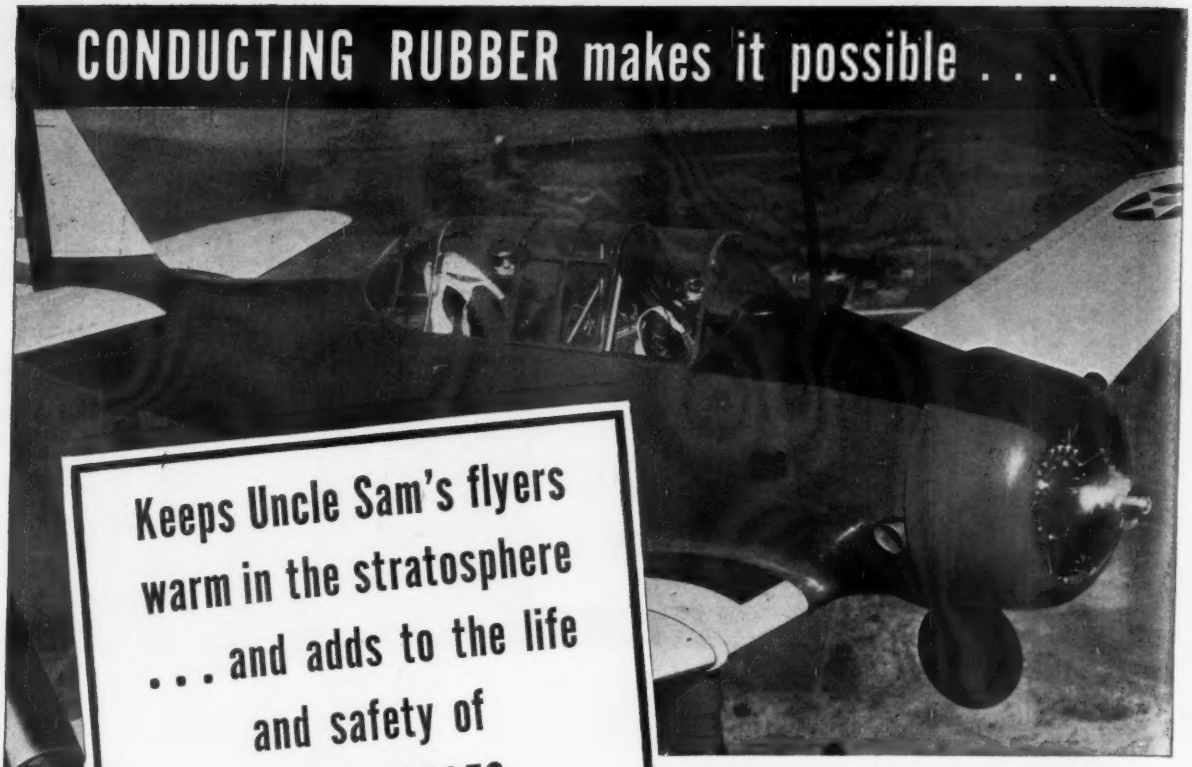
The Hazard line of building wires manufactured in accordance with the new code standards makes it possible for architect or contractor to "Specify Hazard" in any of these grades in full assurance of obtaining wires that satisfy the particular installation requirements for which they are designed and approved.

For complete information regarding the right Hazard wire for any installation write to

HAZARD INSULATED WIRE WORKS
Division of the Okonite Co.
Wilkes-Barre, Pa.
Offices in principal cities

SPECIFY HAZARD Building Wires

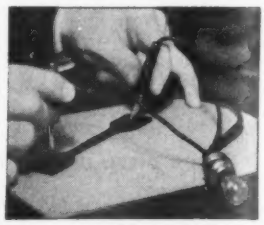
CONDUCTING RUBBER makes it possible . . .



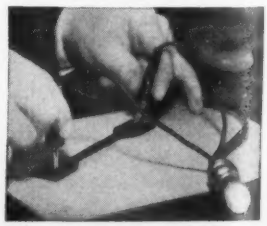
Keeps Uncle Sam's flyers warm in the stratosphere . . . and adds to the life and safety of POWER CABLES

FLEXIBLE STRIPS of conducting rubber concealed in a new undersuit heat up like wires in a toaster; keep army stratosphere flyers warm at 60° below zero.

American Steel & Wire Company's Type PS Semi-Conducting Shielding (Conducting Rubber) eliminates electronic ionization of air gaps and adds years of service to the life of power cables.



THESE PHOTOGRAPHS taken in our laboratory show a 15 watt bulb being lighted by the flow of current from a 110 volt plug-in, through an ordinary "dumb-bell" sample of conducting rubber. These tests indicate that a wide range of conductivity in rubber is available, and this conductivity can be varied to suit the best design of the cable.



ORDINARY types of power cable shielding have one outstanding weakness. Bending the cable during installation or thermal expansion and contraction in service tends to separate the shielding from the underlying insulation—thus producing air gaps. At every point where such air gaps occur, gradual disintegration of the insulating compound results—and the life of the cable is reduced.

Now, American Steel and Wire Company's development of Type PS Semi-Conducting Shielding prolongs cable life by overcoming this difficulty. Type PS Semi-Conducting Shielding is always in intimate contact with the cable insulation. It is as flexible as rubber because it IS rubber—conducting rubber! When used with rubber insulation, Type PS Semi-Conducting Shielding not only adheres to the insulation, but becomes an integral part of its surface.

The problem of producing conductivity in rubber compound without sacrificing flexibility or other rubber-like properties has finally been solved. And we now offer a proven, thoroughly tested conducting rubber compound for use in power cable construction. Write today for more complete information.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

CAN THE METER DO IT?

WHEN their children were younger and the Jones' were getting their start, they used to put the lights out pretty early . . . But now take a look: every light in the house going, to say nothing of the radio, the percolator, and perhaps the waffle iron—if Mary is entertaining friends!

It didn't take so long for this to come about. The meter down in the basement, that was put there in the middle '20's, still looks black and shiny. However, the meter has not grown up with the Jones' . . . No doubt there are some families that haven't changed so much, BUT THE JONES' SHOULD HAVE A MODERN METER!

Use MODERN METERS for MODERN LOADS—it pays!

TYPE MF-A

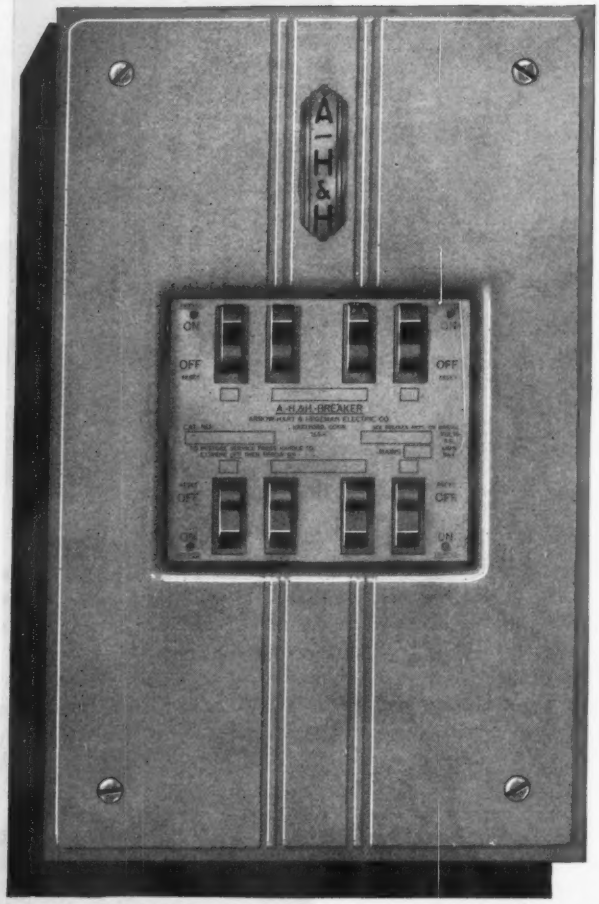
ALNICO DAMPING MAGNET • LIFE TIME BEARINGS • STRAIGHT LINE ACCURACY UP TO 400% RATED LOAD • MICRO-SET ADJUSTMENTS • PORCELAIN TERMINAL BLOCK AVAILABLE • COMPLETE COMPENSATION • PRECISION CONSTRUCTION • FOR COMPLETE INFORMATION, WRITE FOR BULLETIN NO. 158.

DUNCAN ELECTRIC MFG. CO., LAFAYETTE, IND.

H & H *New improved*

BREAKERS

SIMPLIFIED LINE



No. 29086-F
Type "CB"
8 Single Pole
Flush Housing

Interchangeable stocks inaugurate new Part Plan

to reduce your stock investment

Order only the parts needed *first;* save carrying-charges on parts needed *later!* Breaker Boxes or Breaker Units (with covers) may be ordered separately as required. By ordering *boxes only* to be delivered for roughing in, the Contractor keeps *un*-needed material off the job at that stage. THIS SAVES TIEING UP MONEY IN STOCK; incidentally saves breakage and loss. When ready for the Breaker Units, the wiring job is so nearly done that your order can take account of any changes from original plan.

PACKAGED FOR USE AS NEEDED

One box may be used *interchangeably* with a number of breaker unit combinations, because they are catalogued and packaged separately. They may be ordered complete if so desired.

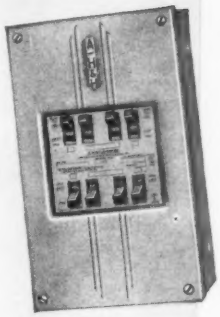
This stock-flexibility helps the Jobber too, in keeping his inventory more closely in line with *actual demand.*

A-H&H

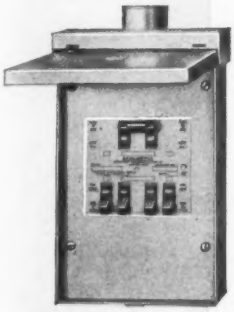
INDUSTRIAL CONTROL DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC COMPANY, HARTFORD, CONN., U. S. A.

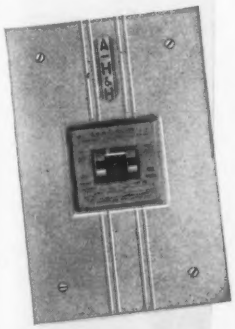
H & H Breakers



No. 29088-S
Type "CB"
8 Single Pole
Surface Housing



No. 29054-R
Type "CB"
4 Single Pole
1 Double Pole
Raintight Housing



No. 29121-F
Type "C-1"
1 Double Pole
Flush Housing

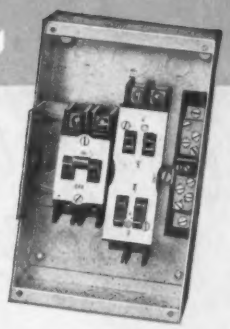
HEART OF THE BREAKER

It's the action of the Bimetal Trip that "makes or breaks" your Breaker. Its operation is made *dependable* by metals of exactly the right properties; by scientific design; by accurate calibration and by safeguarding against distortion that might alter its accurate setting.

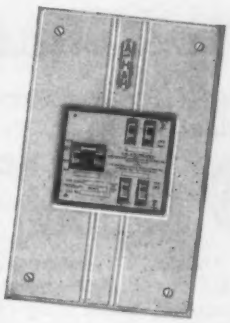
H & H Breakers are IMPROVED Breakers in all these particulars. The all-important Bimetal Trip is supported and held permanently in place by *three screws.* This fastening holds the Bimetal intact against possible mechanical injury, distortion or strain . . . All H & H Breakers are fully tested and approved by The Underwriters' Laboratories, Inc.

Send for complete-line Bulletin with simple Ordering Plan

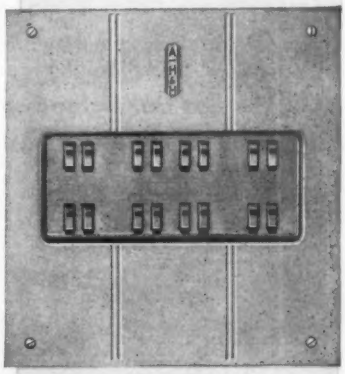
This plan permits the *simplest ordering procedure* in stocking Breakers for all common needs. Each shipping package is plainly marked with its own Catalog Number exactly as listed in our Catalog under the Part Plan; complete Breakers are identified the same way. Stocks may be easily checked; there are fewer items to order, and your reduced stock means a *minimum investment.* The special Bulletin offered here is your Condensed Catalog of this Line . . . the *KEY* to the Part Plan. Send for it and *save* all along the line.



Type "CBC"
4 Single Pole
with separate
Double Pole



No. 29143-F
Type "CBC"
4 Single Pole
with Separate
Double Pole
Flush Housing



No. 29099-S
Type "CB"
16 Single Pole
Surface Housing

INDUSTRIAL CONTROL DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC COMPANY, HARTFORD, CONN., U. S. A.

A-H&H

Utilize that narrow place-

AND SAVE VALUABLE FLOOR AND WALL SPACE!

Where space is not available for a standard width panelboard, the

TYPE AC CIRCUIT BREAKER

COLUMN TYPE PANELBOARD

is the answer. It may be placed between the flanges of an 8", 9" or 10" H column — between windows — or in any other narrow space. There it is up off the floor, out of the way.

Built of standardized units, the FA Column Type Panelboard affords automatic protection against sustained overload, and prevents interruption of service from momentary overload. In the case of a short circuit, or sustained overload, service is quickly restored (after the cause has been removed) simply by moving the handle to the ON position.

Furnished for either single-phase, 3-wire, 115/230 volt or 4-wire, 120/208 volt solid neutral service — with 4 to 40 single-pole branch circuits.

Let Our Sales-Engineers Help You

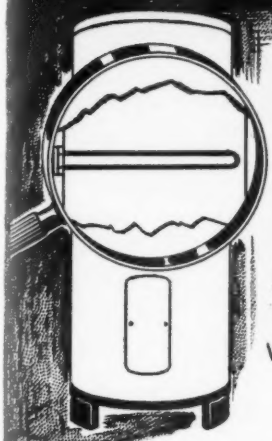
with your light and power distribution problems. Their long experience is at your service — without obligation. Write for name and address of the one nearest you — and for Bulletin 62 . . . Frank Adam Electric Company, St. Louis, Mo.

EST. 1891 — THE SIGN OF A BETTER JOB — FA — Frank Adam — 1891 FIFTY YEARS SERVICE 1941 — FRANK ADAM ELECTRIC CO. ST. LOUIS, MO. U.S.A.

Illustrated is Catalog Number NAC1BC20-3L10 Column Type Panelboard with Wire Duct and Pullbox.

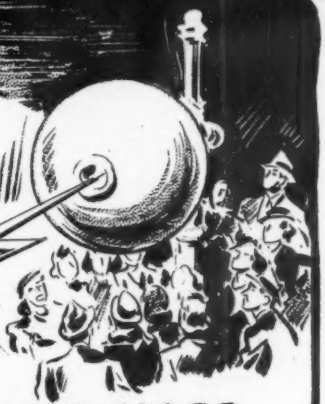
Other FA Products for Industry: Feeder Busduct . . . Plugin Busduct . . . Shutlbrak Safety Switches . . . Power and Light Distribution Panelboards (Standard and Column Types) . . . Klampswitchfuz Narrow Distribution Panelboards (for floor and wall mounting) . . . and many others.

WOULD YOU BELIEVE IT?



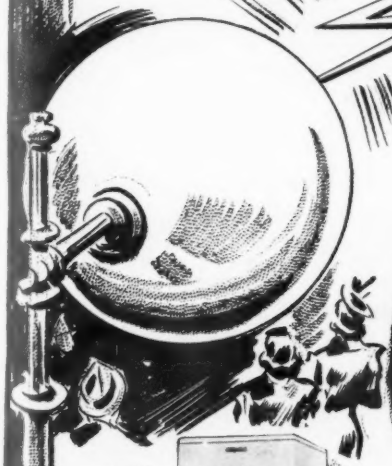
MAXIMUM RETURN

EVERY DOLLAR SPENT FOR ELECTRICITY IS INSURED BY THE HOTPOINT CALROD HEATING UNIT IMMERSED DIRECTLY IN THE WATER—PURE ELECTRIC HEAT IS RELEASED FROM IMMERSED UNITS WITHOUT WASTE!



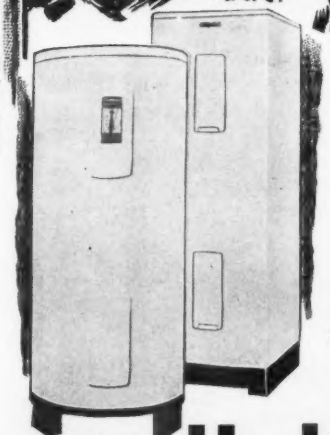
MAN-MADE LIGHTNING

SEVERAL THOUSAND VOLTS HAS BEEN USED TO TEST THE NON-CONDUCTING PROPERTIES OF CALROD'S EXCLUSIVE "SAFE-T-SEAL". IT PASSED THE TEST WITH FLYING COLORS - PROVING IT'S ABILITY TO DELIVER LONG, TROUBLE-FREE SERVICE!



1941 1940 WAS BIGGEST YEAR

IN ELECTRIC WATER HEATER HISTORY, AND HOTPOINT OUTSOLD ALL OTHER MAKES! NEW HOME BUILDING AND MODERNIZING ARE STILL SKYROCKETING—PROMISING AN EVEN GREATER MARKET THIS YEAR!



HOTPOINT Electric Water Heaters outsell all others because: 1. Hotpoint is the best-known and most complete line in the industry. 2. It is backed by a powerful trade paper advertising campaign reaching builders—men who account for 70% of water heater sales. 3. Homeowners read the Hotpoint Water Heater story in national magazines. To help clinch all these sales Hotpoint gives you tested, sure-fire sales promotion helps. Edison General Electric Appliance Co., Inc., 5614 W. Taylor St., Chicago.

AUTOMATIC ELECTRIC **Hotpoint** WATER HEATERS

Electric Ranges • Refrigerators • Washers and Ironers • Clothes Dryers • Automatic Dishwashers • Electrasink

Edison General Electric Appliance Co., Inc.
5614 West Taylor Street, Chicago, Illinois

Please send me full information on the complete line of Hotpoint Automatic Electric Water Heaters.

*Name*_____

*Address*_____

*City*_____ *State*_____

HERE'S REAL *DUCT ECONOMY*

Economy at installation

Savings are immediate when you use Transite Ducts. Made of asbestos and cement, Transite *Conduit* is so strong that no protective casing is needed underground. And, on exposed locations, its light weight, 10-foot sections and simple assembly speed up work, cut costs. Where an encasement is required, Transite *Korduct* provides maximum duct economy. Thinner-walled than Transite Conduit, otherwise identical, its long lengths cut down the number of spacers needed, mean fewer joints. And because both these better ducts have a permanently smooth bore, cable pulls are easily made not only at installation, but also during replacements even after years of service.

Economy in maintenance

Completely fireproof, Transite Ducts minimize burnout troubles . . . won't generate dangerous fumes or gases. On concreted-in work, they actually provide extra fire protection between cables. In all cases, maintenance stays low, for Transite Ducts won't rot or rust, offer unusual resistance to weather and corrosion.

Economy in cable operation

Increased system efficiency features every Transite Duct installation. Transite's high rate of heat dissipation provides greater system capacity or the lower cable operating temperatures that result in decreased copper losses, and longer cable life.

If you are not now taking advantage of the new economies in distribution made possible with Transite Ducts, may we send you full details? Write for brochure DS-410. Johns-Manville, 22 E. 40th St., New York, N. Y.

Johns-Manville

TRANSITE DUCTS

TRANSITE CONDUIT . . . for exposed work and for installation underground without concrete encasement.

TRANSITE KORDUCT . . . for installation in concrete. Thinner-walled, lower-priced, but otherwise identical with Transite Conduit.

In the interest of National Defense we urge your cooperation with all wire and cable manufacturers.

GENERAL CABLE CORPORATION

TEST-TUBE BABY... it brings cable mortality rates 'way down

IT'S NOT a very handsome baby as babies go. But, in action, you'll recognize a great basic improvement in impregnated paper power cable. It is Anaconda's new construction known as Type CB*.

It was born in the Anaconda laboratories, when an engineer applied the principle of conditioning oil by the introduction of carbon black, in a series of experiments then being carried on.

This principle when applied to paper-insulated oil-impregnated cable more than trebled the life of the cable, under accelerated aging tests.

And therein lies a story:

It is the story of Anaconda research... research that has produced scores of test-tube babies whose method of creation has been a boon to wire and cable users. In addition to Type CB, there is Sunex Securityflex*, the cable that operates as efficiently 10,000 ft. high in the mountains as 3,000 ft. below the earth's surface.

There are a host of other Anaconda products with special properties for standard and special wire and cable requirements . . . one or many of which may suit your particular conditions. Put them to work for you! *Reg. U. S. Pat. Off.

Anaconda Wire & Cable Company
General Offices: 25 Broadway, N. Y. C.
Chicago Office: 20 North Wacker Drive.
Subsidiary of Anaconda Copper Mining Co. Sales Offices in Principal Cities. 41388

ANACONDA
from mine to consumer
REG. U.S. PAT. OFF.

This familiar trademark identifies Anaconda products. It symbolizes the best efforts of man and science

USE MODERN IMPROVED
ANACONDA WIRE AND CABLE

MAY, 1941

Volume 21 No. 5

ELECTRICAL SOUTH

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RICHARD P. SMITH, Promotion Manager
W. E. COOGLER, Production Manager

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ATLANTA, GEORGIA

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ATTENTION LIGHTING SALESMEN!

HOW MANY OF YOUR CUSTOMERS WOULD FLUNK THIS *Lighting Quiz?*

THE LIGHT IN SHADE IN SUMMER IS HOW MUCH STRONGER THAN THE AVERAGE LIGHT IN HOMES AT NIGHT?

ABOUT 5 TIMES ☐ 25 TIMES ☐ 100 TIMES ☐

1

2

HOW MANY GRADE SCHOOL CHILDREN HAVE DEFECTIVE EYESIGHT?

1 IN 5 ☐ 1 IN 25 ☐ 1 IN 50 ☐

3

DARNING STOCKINGS MAY BE DIFFICULT BUT IT'S EASIER THAN READING A BOOK

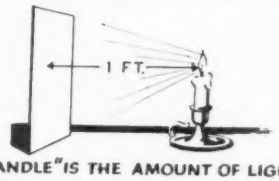
TRUE ☐ FALSE ☐

4

AS EYES GROW OLDER THE PUPILS CONTRACT REQUIRING

MORE LIGHT ☐ LESS LIGHT ☐

5



A "FOOTCANDLE" IS THE AMOUNT OF LIGHT THROWN BY A CANDLE A FOOT AWAY . . .

HOW MANY FOOT CANDLES HAVE YOU IN YOUR LIVING ROOM? HOW MANY SHOULD YOU HAVE?

ANSWERS TO LIGHTING QUIZ:

1 Frequently 100 times stronger. **2** One out of five grade school children. Two out of five at college age. **3** FALSE. Several times as much light is required for darning socks. **4** More light required. As eyes grow older, the pupils become smaller and *more* light is necessary for seeing. **5** You should have at least 20 to 30 footcandles of light in your living room at every easy chair or davenport, used for reading.

EIGHT years ago this summer, the Better Light-Better Sight Program was started. Despite all the progress made to date, there is still a lot of educational work to be done. With fifty footcandles looming up as practical levels in commerce and industry—being installed by more progressive business men—a lot of education remains to be done if the average business is going to use this new fluorescent lighting, for example, to produce more profitable sales rather than a mere reduction in operating expenses.

THE PROPER LEVELS OF LIGHT can be sold—are being sold—where the salesman particularly understands the customer benefits of adequate lighting, (as dramatized in the quiz above), and where the salesman is backed up by advertising and demonstration directed to the customer.

1941 must be a year of *education*—as well as *sales*. When you show the man who runs a factory, office, or store what a powerful new force modern lighting is—when you prove that the additional expense of a 50-footcandle installation can come back many times over in reduced errors, increased sales or production, faster work, and improved morale—you've gone a long way toward making a sale!

JOIN THE FORTY-NINERS CLUB! Membership in the 49-ers Club is extended to any salesman primarily responsible for selling an installation of 49 footcandles or more, or to any executive who works under 49 maintained footcandles. For full details, write Secretary, Forty-Niners Club, General Electric Company, Nela Park, Cleveland, Ohio. Or consult your G-E Lamp Division!

G-E MAZDA LAMPS

GENERAL ELECTRIC

ELECTRICAL SOUTH

MAY, 1941

THIN-WALL WIRE GETS CREDIT FOR BUILDING MODERNIZATION

Rewiring and relighting made possible by small-diameter wire aids entire industry. Building owners, electrical contractor, utility and manufacturers share in benefits.

By G. H. Preacher
Lighting Engineer
So. Carolina Electric & Gas Co.
Columbia, S. C.

AN OUTSTANDING example of the use of small-diameter wire to promote the modernization of commercial office buildings is to be found in the rewiring and relighting of the Liberty Life Building, of Columbia, South Carolina.

Without disturbing the conduits buried in concrete, the contractor was able to install new copper capacity permitting an increase in load from 3 watts per square foot to 12 watts per square foot. With this additional capacity available, the building owners were induced to relight the entire building, and lighting levels were raised from an average of 3 to 6 foot-candles to 20 to 35 foot-candles.

The net result to the industry of this installation was a $13,400 job to the electrical contractor, a considerable part of which was for wire and wiring devices; a $5,000 sale of lighting fixtures for a fixture manufacturer; and an increase in load for the utility company of more than 100 per cent, representing an increase in annual revenue for the utility of approximately $2,140. The benefits to the building owner are equally as tangible: satisfied tenants, improved occupancy, and higher scale of rental.

How the Job was Sold

The manager of the building, Walter T. Love, was first contacted by the writer to give him data relative to the consolidation of the power and light service under one meter registration instead of two as then was the case. This led to a request for information as to how this could be accomplished. This request presented the opportunity of making a thorough study of the wiring conditions in the building.

The Liberty Life Building, 12-story structure of Columbia, S. C., which has just been completely rewired and relighted. Small-diameter wire was an important factor in making the installation feasible.

It was easily shown that the existing wiring system was entirely inadequate to carry the existing light load, to say nothing of any increased load.

The fact that many tenants had made requests for better lighting and for convenience outlets, of which the building had none, made the job of selling the idea of better lighting fairly simple. However, an economical means of providing adequate wiring had to be found.

The problem was what to do about rewiring with the conduit buried in concrete and these conduits being filled to capacity. The possibilities of small-diameter wires as the answer to this problem was presented to the building manager and owner. As a result of this presentation, a request was made by the building management for a complete wiring and lighting recommendation.

A complete survey of all wiring and electrical conduit in the basement and on each of the eleven floors was made and drawings made. Then detail drawings were prepared showing all changes and additions in the electrical work for these areas. Also a complete panelboard design together with riser diagrams were provided. These drawings enabled the building management to get bids from the contractors on identical work performance.

The building, constructed in 1900 of concrete, tile and brick,

These views are typical of the lighting throughout the upper floors of the building before the rewiring and relighting project. Glaring bare bulbs and harsh shadows resulted in poor efficiency and eyestrain on the part of employees.

has outside dimensions of 52 feet by 100 feet. The entire building consists of a basement, ground floor and eleven floors occupied as offices. The ground floor is occupied by a bank, and as it has been recently rewired and lighted it was not considered as a part of this presentation.

The office space comprising eleven floors has an average of fourteen offices on each. Office areas are 13′9″x20′10″ with a ceiling height of 10′4″, except on the second floor where the ceilings are 14′6″.

All wiring was in concealed rigid conduit and unless the conduit in place was utilized the cost of rewiring would have proved prohibitive.

Former Lighting System

(a) Outlets. Each room had a total of five ceiling outlets, one outlet in the center of each room and an outlet adjacent to each corner. The corner outlets were wired eleven to a circuit and the center lights three to a circuit as the average, but this number of outlets per circuit were exceeded in some instances. In the majority of offices, the ceiling outlets were equipped with drop cords and multiple sockets for plugging in portable electric devices. This was necessary as there were no convenience outlets in any of the offices.

(b) Wattage Limitations. The lighting circuits operated on a 3-wire, 115-230 volt single-phase system with a 400-ampere, 3-pole fused main switch and three No. 6 R. C. wires fused at 60 amperes serving a twelve-circuit fuse panel on each floor.

This wiring, together with the number of outlets per circuit, limited the total watts per square foot of office area to something close to three watts, which included capacity, available to all the various other electrical services as well as lighting.

(c) Equipment. The lighting equipment usually consisted of a center fixture which was made up

of three sockets which were surmounted by a flat glass plate, thus leaving the bulb or bulbs exposed. The usual procedure was to lamp this unit with three 100-watt inside frosted lamps. In some few cases this fixture had been replaced with a ceiling-mounted 14 inch enclosing globe lamped with a 150-watt bulb.

This center lighting unit was usually supplemented with one or more drop lights from the corner outlets. These drop lights in the majority of cases were not properly shielded.

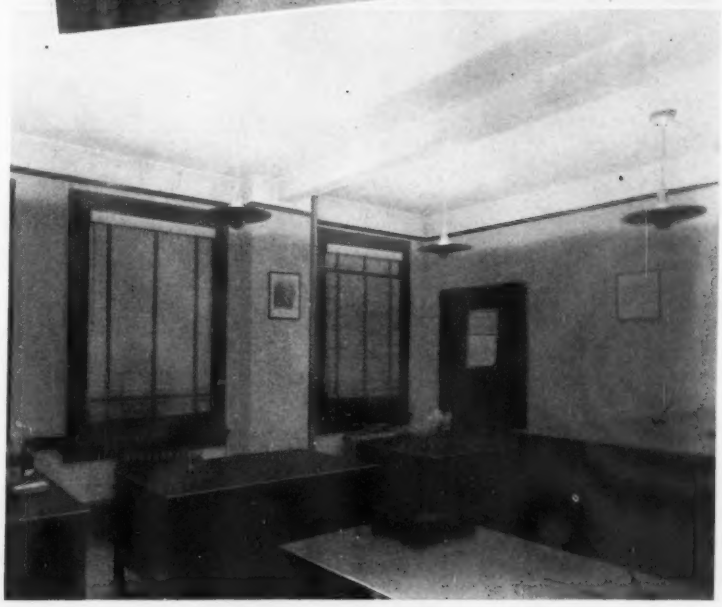
(d) Foot-candles. The illumination averaged between 3 and 6 foot-candles over the office area with some of the working areas on the desks having 50-75 or even 100 foot-candles of raw unshielded light. This condition of high and low levels of illumination on the same working area together, with glaring light sources and contrasting bright and dark sections in the offices, contributed to the low standard of light quality.

Many of the office workers complained of having headaches and in most offices the lights were turned on only when absolutely necessary.

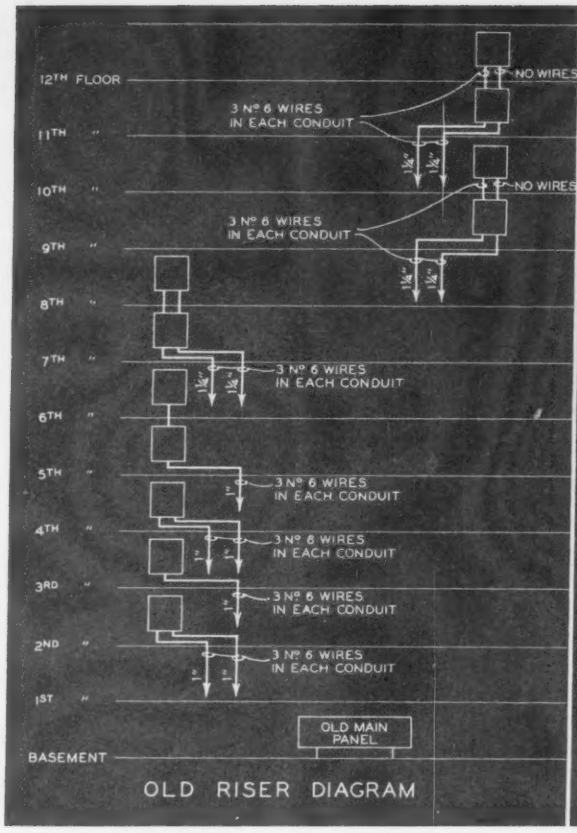
The New Wiring System

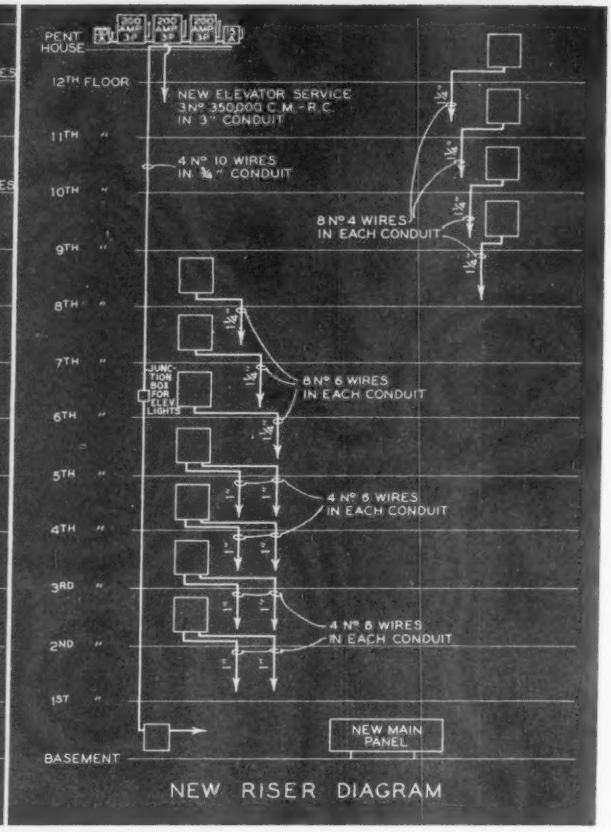
The new wiring system is a 4-wire, 120-208 volts single and three-phase "Y"-connected system supplying both power and lighting service. The main switch is of 2,000 amperes and each floor is served by two sets of four No. 6 type SN wires, fused at 100 amperes, serving a 40-circuit panel on each floor in contrast to the old system of three No. 6 R. C. wires at 115-230 volts, single phase, serving a twelve-circuit panel.

The corner outlets were wired three to a circuit as against the old system of eleven to a circuit, while the center outlets were improved from three to two per circuit. The foregoing gains in capacity were made economically feasible through the employment of the new type SN (thin wall)



Most floors were relighted with 500-watt totally indirect silver bowl luminaires, providing a minimum of 20 foot-candles. Floors with high ceilings were lighted with four-lamp, 48-inch shielded fluorescent luminaires, providing minimum of 30 foot-candles.





Above: Comparison of old and new riser diagrams. The tabulation at right outlines some of the results obtained through rewiring the building.

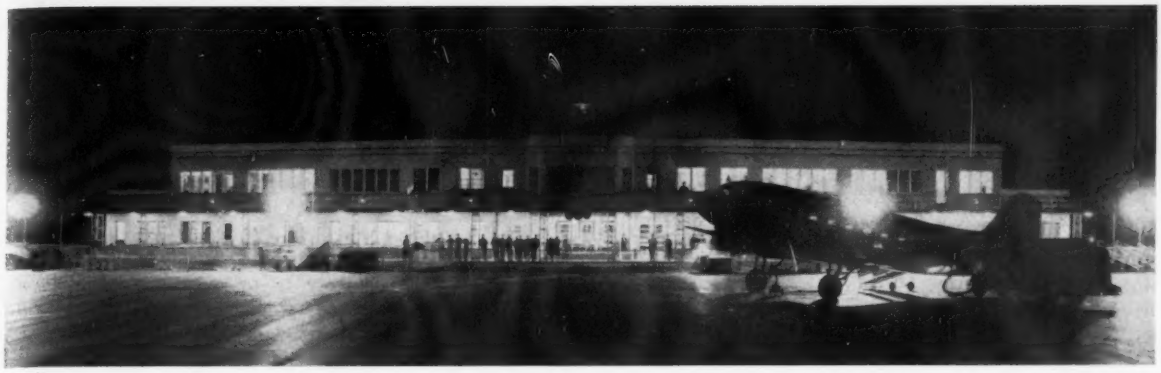
wire in the existing conduit system. This improvement was actually from three watts per square foot to twelve watts per square foot.

New Lighting System

After a very careful study both as to the illumination requirements and economic considerations the following solution to the lighting problem was reached. With the exception of the second floor, all active areas were equipped with 500-watt totally indirect silver bowl luminaires (Curtis No. 1020) to provide a minimum of 20 foot-candles. In many areas where close visual work was being done upwards of 30 foot-candles were provided, because of lower utilization factors on the second floor, due to high ceiling and narrow rooms, fluorescent lighting was indicated as the best solution from standpoint both of total annual operating cost and the mainten-

(Continued on page 84)

CHARACTERISTIC:	BEFORE:	AFTER:
Foot-Candles	3—6	20—35
Light Quality	Glaring Poor diffusion Harsh shadows Bad contrast	Source concealed Uniform lighting No harsh shadows Good brightness ratio
Appearance	Unsightly and disorderly appearance	Neat and pleasing in appearance
Office Worker Reaction	Dissatisfaction and complaints prevalent Suffering from headache and eyestrain	Unanimous approval Eyestrain relieved
Wiring	Overloaded High line loss Unreliable Bad voltage regulation 400 amp., 115-230 volts, single-phase	Capacity for 50% increase Less than 1% voltage drop No service interruption from overload 2,000 amp., 120-208 volt 4-wire "Y"-connected
Decorations	Dark walls Dirty ceilings Dark Venetian blinds Cement floors Bad contrast	Light colored walls Flat white ceilings Light colored Venetian blinds New floor coverings Pleasing contrast
Results for Building Owner	Dissatisfied tenants	Satisfied tenants Improved occupancy Higher scale of rental
Annual Kwh Consumption	120,000 kwh.	264,000 kwh.



Wiring an Airport Building

A modern air terminal administration building has a wide range of uses for electrical service, many of which present unusual problems.

By Nat M. Johnson

MODERNITY in an airport administration building would not be complete without an up-to-the minute wiring and lighting installation—and the quarter-million-dollar municipally-owned Love Field building at Dallas, Texas, is a good example of the perfect job. Electrical contractor was Republic Engineering Co., Dallas, owned by W. C. Walls.

Passengers on airliners making but brief stops in Dallas can telephone friends or business associates without leaving their seats in the ship. By means of several service pits, placed at points convenient to planes, plug-in connections are available so that a telephone can be placed in a ship and the passenger can actually do his own dialing.

Hot weather of the arid Southwest need not bother Love Field patrons or visitors. Cold or heat from the air conditioning equipment in the basement is carried by tubes to the pits, from whence it can be extended into the ships. In hot weather, the minute a plane lands, attendants attach the cold air hose and those passengers remaining in the ship are just as comfortable as people in the air-conditioned terminal building. In winter, hot air is piped into the plane.

The pits, located about 120 feet from the terminal building, are 2½ feet square and 2 feet deep, and are covered by a removable grating. Each pit has telephone connections, base plugs, starting switch for fans, switch for motor generating set for starting planes, air tubes, and air line for the pilot to use in blowing out his ship.

Wiring inside the building provides for the increase that is sure to come in lighting and power loads, as well as the extension of telephone lines. In the offices there is a plug-in strip raceway at upper part of baseboard for telephones and electric lines. All outside and inside walls on both

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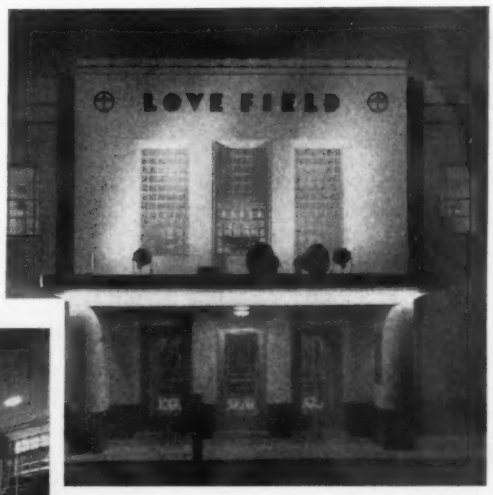


Wiring adequacy for future load increases was one of the features of the new quarter-million dollar administration building at Love Field, Dallas, Texas. At left, a view of the spacious lobby, and above, the attractively lighted front entrance.

Successful Profit-Sharing Plan For Remunerating Salesmen

By Ruel McDaniel

THE greatest problem facing the average electrical appliance dealer, thinks M. T. Wetherbee, sales manager for Wands, Inc., of New Orleans, is obtaining — and keeping — good salesmen. And perhaps the most troublesome problem in getting and keeping good salesmen is in finding and using a practical remuneration plan.

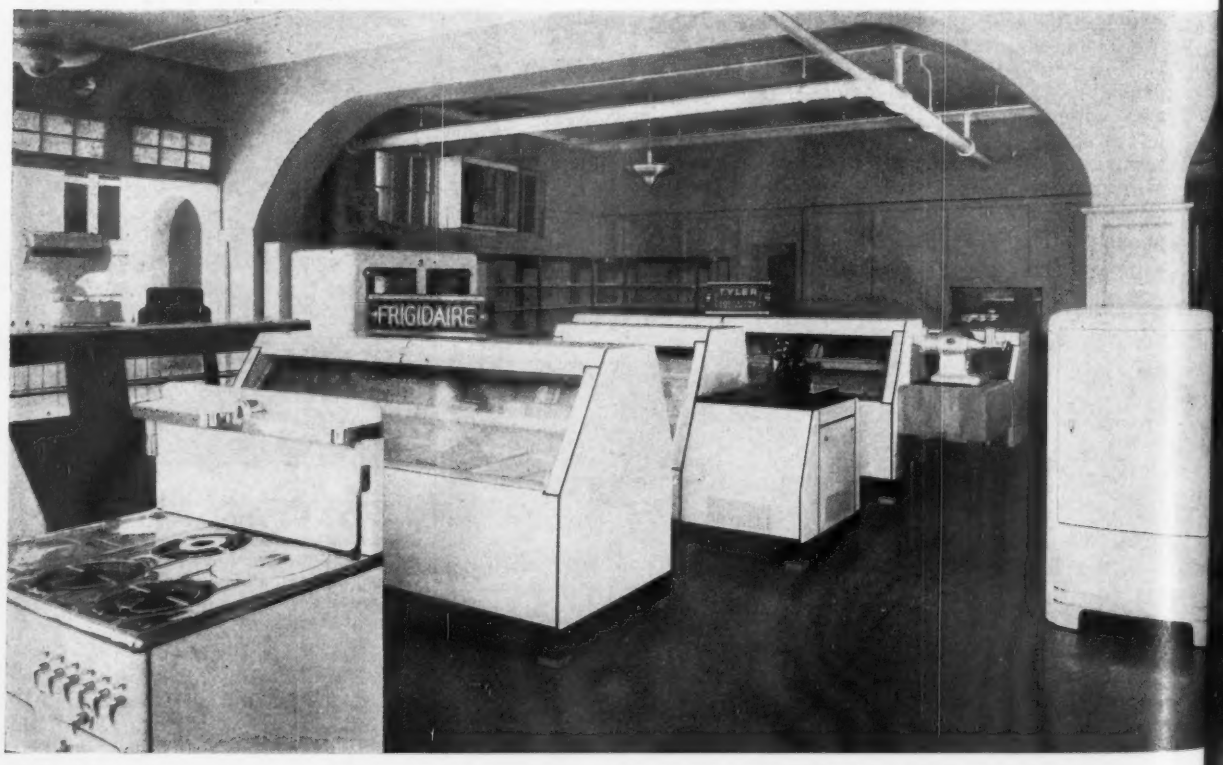
This firm has experimented at length with various plans for paying appliance men; and out of these experiments has come a plan which has materially cut down the rate of turnover among salesmen and at the same time made it possible to keep good men, once they have learned the business of selling appliances and become valuable to the company. Not only does the plan provide fair remuneration for the salesmen but it assures the company of a profit from each man's efforts, whether he be a good or a mediocre salesman, Mr. Wetherbee points out.

The company employs about eleven salesmen, divided into two classifications. Three men sell commercial refrigeration and allied units, while the rest of the force devotes itself to the sale of domestic appliances. Although the commercial department does an even greater volume in refrigeration units than the domestic department the company sold more than 500 new domestic units last year.

The remuneration plan, whether applied to commercial or domestic unit salesmen, is basically the same. It consists of a small salary and a commission or a percentage of the net profit from each sale.

"The salary is small and does not provide enough for a man even to live on," Mr. Wetherbee explains, "and we do not mean for him to try to live on it, otherwise, the plan would defeat itself. It merely is to help a man over a tough spot now and then and keep him from coming to work with a long face, caused from worry about immediate cash for incidentals."

Men who sell domestic appliances exclusively draw an average of $40 a month salary. This is an outright salary and does not apply against the salesman's commission or his share in the profit from a sale. However, it is based on an individual sales quota, and unless a man makes his quota, his work is not considered satisfactory. However, a salesman starts each month with a clean slate. If he should have failed to make his salary sales quota during a specific month, that discrepancy is not charged against him the following month. If his services are considered valuable enough for the company to keep him on the job, the salary loss is overlooked.



Domestic appliance men work, not strictly on commission, but on a profit-sharing basis. The company calculates the cost of a unit sold, adding freight, drayage from shipping depot to the warehouse if such is to be charged, cost of delivering the unit to the customer, and the cost of installation—in other words, the total cost of the unit installed in the customer's home. This total cost deducted from the net selling price gives the net profit, for profit-sharing purposes.

The salesman then receives a specified percentage of this net profit, the exact figure Mr. Wetherbee declined to make public. This "cut" in the profits is of course above and entirely separate from the salesman's small monthly salary. His monthly quota is based upon his share of the profits earned from his own efforts, however.

"Since using this plan of remuneration, we have reduced materially the turnover in our domestic sales department," Mr. Wetherbee declares. "The salary is small enough that no salesman of any value at all will go to work merely to draw the salary. Yet it is sufficient to bridge him over the lean spots and keep him from worrying when he fails to make a profit for several days running. By dividing profits with him, we give him the feeling that he is, in a manner, in partners with the firm; and he certainly is in business for himself. He realizes that the more money he makes for us, the more he makes for himself; and the plan is so worked out that a good salesman is rewarded for his work in direct proportion to his results. There is no limit placed upon what he can earn, if he is big enough to earn it."

An outstanding feature of the exterior of Wand's, Inc., of New Orleans, is the moving picture type silhouette sign running the entire length of the store front. Below, a general view of the firm's attractive display floor, commercial equipment at left, domestic at right.

The commercial men work on a somewhat different basis, although the plan fundamentally is the same. The commercial salesman, being harder to obtain and harder to train, receives a monthly salary of $65. This, as in the case of the domestic man, is entirely aside from commissions or profits, but it is used as a basis of setting

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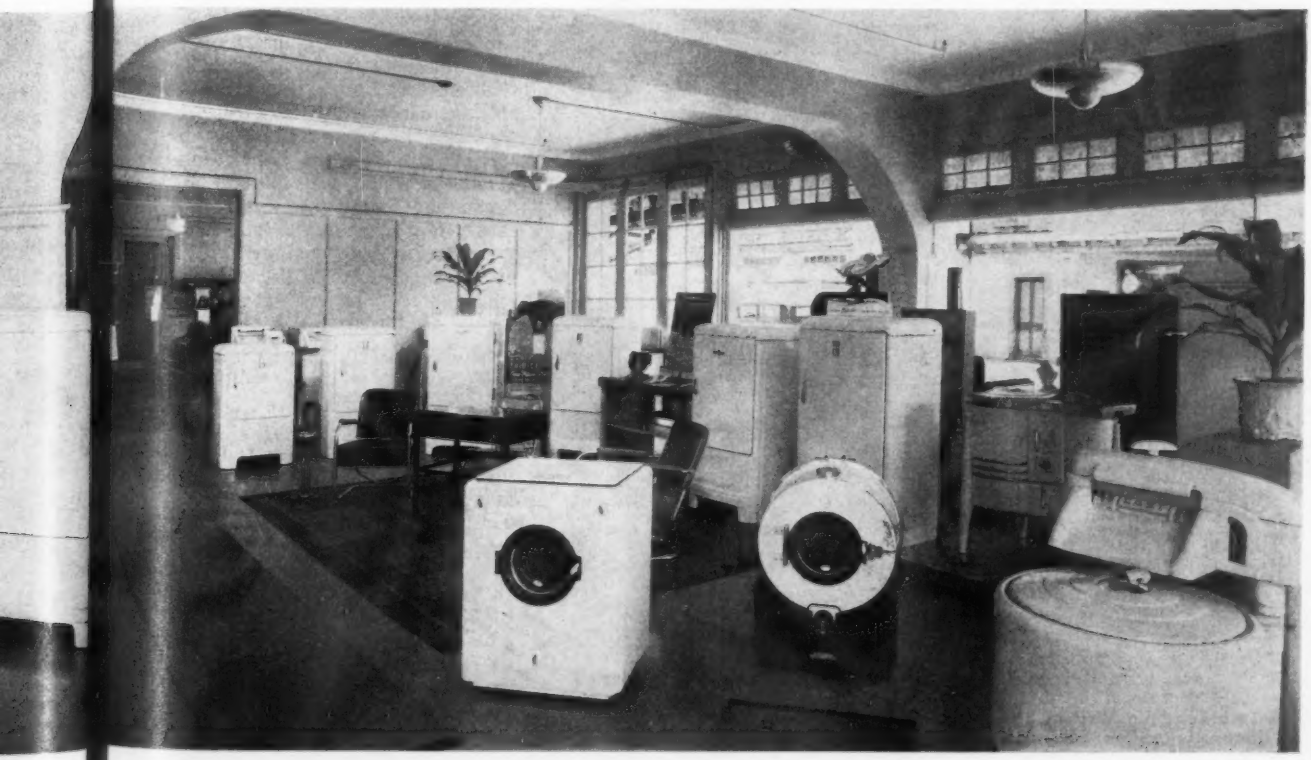


Fans Come Out of the Kitchen

Ventilating fans are rapidly finding an important place in commercial and industrial occupancies. Experience of Alabama Power Co. indicates the diversity of prospects.

By Geo. H. Watson

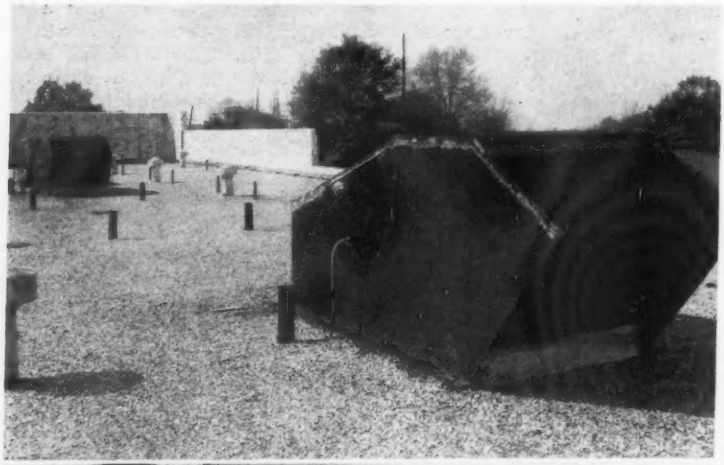
THE ventilating fan, for a time overshadowed somewhat by air conditioning in commerical buildings, has come into its own again and is being applied to more and more types of business establishments, according to George F. Holmes, supervisor of commercial sales for the Alabama Power Company. With his assistance, some outstanding jobs have been sold, engineered and installed in the company's territory within the past year.

It was air conditioning which, in a sense, prepared the way for greater ventilating fan sales, Mr. Holmes pointed out. It was through air conditioning in the larger theatres, hotels, restaurants and the like, that the public became aware that comfort conditions can be provided in the summer time by mechanical means.

But, he added, there are a lot of operators who for one reason or another do not want to make the expenditure required for complete air conditioning. It may be that a short lease is involved; or that the type of building is such that economical air conditioning is not feasible; or that the customer frequency does not justify air conditioning. Whatever may be the reason, and there are many, these are good prospects for fan installations. Southerners like to open their windows in summer, and that is another reason for the popularity of the fan over air conditioning.

"Usually the profit motive dictates the fan installation just as in air conditioning," said Mr. Holmes. "In other words the customer wants to provide for comfortable conditions, so more customers will come in, stay longer, and buy more, hence this motive is stressed in making the sale."

However, in at least one big installation reported by Mr. Holmes the profit motive was not the dominant factor. This was in the plant of the Empire Laundry in Montgomery. This enterprising concern has for several years had air conditioning in its office, but employees in the plant proper still worked under very unfavorable conditions. In fact, the temperature in the summer around some of the pressing and ironing machines reached as high as 127 degrees. Employees, especially those new to the jobs, sometimes were affected seriously by the heat.



Small hotels provide good fan prospects. The above installation was recently completed in the new Covington Hotel, at Opp, Ala. Four 50-inch fans mounted on the roof have proved most satisfactory. The lower photo shows louvers in hall ceilings through which air is drawn.

26 Fan Installation

It was chiefly to provide more comfortable working conditions for employees that twenty-six 50-inch fans were installed in one side of the high steel-roofed building. This is no doubt one of the most ambitious fan installations in the country. Fresh air is drawn in through windows, circulated through the plant and drawn out through the fans and at the rate of 330,000 cubic feet per minute. This air circulation was sufficient to reduce the temperature in the plant to within four degrees of the outside temperature. While humanitarian principles largely were

responsible for the installation, laundry officials report that employees are much more efficient in their work.

Another outstanding installation was made in the senate and house of representatives of the Alabama state capitol. This consists of eight window fans in the house of representatives, each of 3,000 cfm, and one large fan of 25,000 cfm. The senate is equipped with five window fans, sufficient to provide comfortable ventilation.

Hotels Good Prospects

Smaller hotels are providing good fan prospects and this was the case with the new 50-room Covington Hotel, at Opp, Ala. Here, entirely satisfactory summer ventilation is obtained by four 50-inch fans mounted on the roof. The fans are of the package type, thoroughly protected against the weather. A feature of this installation is the self-closing and opening louvres in the ceiling of the top floor of the hotel. These louvres also have a fusible fire link for automatic closing in case of fire. Other fans in this hotel include a 16,500 cfm fan for the coffee shop and one of 7,500 cfm for the kitchen.

Beauty shops, according to Mr. Holmes, are extra good fan prospects.

An interesting installation, recently completed, was made in a beauty shop at Greenville, Ala. The beauty shop is located in the back of a general store and one of the problems was to get the air circulation all the way through the store. This was accomplished by having grilles placed in partition doors and the front windows louvred in the proper manner. Two fans in the rear provide an air circulation of 30,000 cfm.

The accompanying illustrations are enough to show that the ventilating fan has really "come out of the kitchen" and is not being thought of so much today as a mere means of exhausting smoke, fumes and odors but as a provider of "sea-breeze" comfort for the customer. To that end it is being installed not only in such places as restaurants and pressing shops, but also in mercantile stores, churches, theatres, hotels, and the like.

Mr. Holmes said that his company was willing to install a fan on trial for the right type of customer. If he will pay for the

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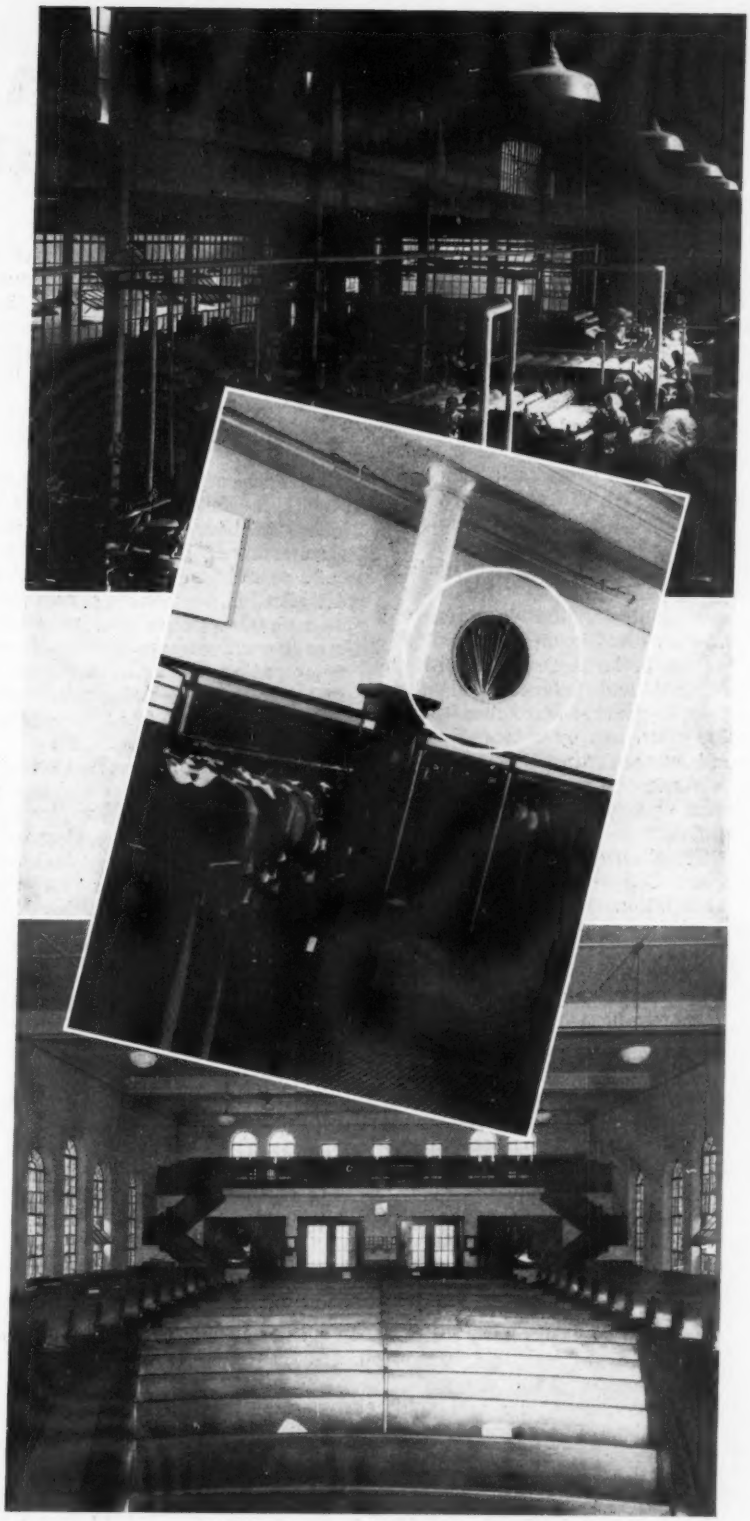


An outstanding commercial fan installation made in Montgomery, Ala., is shown at top. Twenty-six 50-inch fans provide comfortable working conditions in this large laundry. At center, an ornamental grill used over fan in a dress shop. Below, note two large noiseless fans installed in a Birmingham church.

Dynamic Program Announced For Edison Institute

A PROGRAM in keeping with the time and as dynamic as the world events that are influencing the life and business of every American is nearing completion for the Edison Electric Institute Convention to be held at Buffalo, N. Y., on June 2, 3, 4 and 5. The activities of electric light and power industry will receive a new and intensive examination at the convention with full regard for the increasingly important task the industry is performing as its part in the national defense effort.

In addition, the delegates will have an exceptional opportunity to become better acquainted with the national and international situations in general through authoritative addresses by outstanding men and women who fill key assignments in the coordination of business and government defense activities.

The chairman of the National Defense Committee of the National Association of Manufacturers, W. P. Witherow, president of the Blaw-Knox Company, will tell the convention of the stupendous effort that American industry is putting forth in doing its full share in National Defense. W. L. Batt, deputy director of the Office of Production Management, has chosen a subject that is of paramount interest to many business men today: the expansion of plant facilities for defense production. This address is expected to give the industry's executives a clearer vision of what will be expected of their companies in the serving of expanding production and should be most helpful as background in the laying out of possible expansion plans along a sound course.

Military, economic and political impressions of the war in Europe will be related by Constantine Brown, writer for the *Washington Star* and a foreign corespondent distinguished for his knowledge of the European situation.

Carl Snyder, economist of the Federal Reserve System and author of "Capitalism the Creator," the book which has been called the most important study of sound economics since Adam Smith's "Wealth of Nations" will discuss "Capitalism—Servant of All the People," with particular emphasis on the light and power industry as an outstanding exemplar of his subject.

Abnormal Conditions

Every speech to be given by leaders of the electrical industry will have vital bearing on the abnormal circumstances of operation under defense and war conditions. Sales, distribution, generating capacity, load characteristics and personnel management are among the phases of operation that will be discussed in relation to the adjustments that are already being made to meet rapidly changing conditions.

The responsibility the sales department has in these changing and critical times will be the subject of R. E. Fisher, chairman of the E. E. I. General Sales Committee. Tom P. Walker, vice president, Gulf States Utilities Company, will demonstrate that plus sales and service values bring results in good will and revenue. The role of cooperative activities in winning public acceptance of utility service will be discused by C. E. Greenwood, commercial director of the Institute. C. J. Strike, president, Idaho Power Company, will speak on water heating demand, on which his company recently conducted a unique and valuable survey.

Symposium on Operation

The greater part of one session will be devoted to distribution. T. G. Hieronymus, Kansas City Power and Light Company, will discuss the emergency capabilities of distribution facilities, and a panel of three executives will present a symposium on recent improvements in distribution and the future possibilities in this field. M. W. Smith, vice president, Westinghouse Electric and Manufacturing Company, E. S. Fields, Cincinnati Gas and Electric Company, and A. E. Silver, Ebasco Services, Incorporated, will be the speakers.

D. C. Prince, manager of commercial engineering, General Electric Company, will stress the vital necessity for cooperation between the light and power industry and electrical manufacturers. C. W. Kellog, president of the Institute, and chief of power in the Mining and Mineral Products Section of the Materials Branch of the Production Division of the O. P. M., will give a comprehensive survey of the electric industry in relation to both normal and emergency activities. Several other speakers, who will be announced later will have important messages for the convention.

Committee meetings and the registration of delegates will occupy the opening day of the convention, Monday, June 2. General business sessions will be held Tuesday morning, Tuesday afternoon, Wednesday morning and Thursday morning. The concluding event of the program will be a luncheon-meeting Thursday afternoon at the Hotel Statler.

The Hotel Statler will be convention general headquarters, and registration and committee activities will be conducted there. All the business sessions will be held in the Kleinhans Music Hall, Buffalo's newest civic pride, a $1,300,000 monument to modern architecture and culture built principally with funds bequeathed the city by the late Edward L. and Mary Seaton Kleinhans. The auditorium, shaped like the prow of a ship, is air-conditioned and acoustically perfect; other rooms in the building provide generous and pleasant facilities for the convention activities.

This auditorium will be the scene on Tuesday evening of a distinguished musical program, especially arranged for the convention visitors. Rose Bampton, leading soprano of the Metropolitan Opera, will appear as guest soloist with the Buffalo Philharmonic Orchestra. Other entertainment has been scheduled for the intervals between convention sessions. There will be dancing in the Terrace Room of the Hotel Statler on Monday evening. On Tuesday a tea for the ladies in the afternoon will be followed by a general gather-

ing in the Terrace Room after the close of the afternoon business session.

A buffet luncheon, to be given by an electrical manufacturer on Wednesday afternoon, will immediately precede a bus trip over the Niagara Frontier to Niagara Falls. Following tea at the Niagara Falls County Club, the party will return about 6 p. m. to the Hotel Statler, where another manufacturer will entertain delegates and guests of the Convention. The bus trip will comprise sixty-five miles along Canadian and American Boulevards —much of it along the edge of the beautiful Niagara River, vistas of the rapids, the gorge and the beautiful lower river valley with a twenty minute stop to view the spectacle of Niagara from the best possible vantage point. Routed to show the principal items of interest of the great Niagara Frontier industrial area, including the power developments and the great electro-chemical and electro-metallurgical plants, this should prove a never to be forgotten trip for convention delegates.

Buffalo's location near Niagara Falls and the Canadian border is expected to add interest for the convention visitors and encourage attendance by members of the Canadian Electrical Association, trade association of the electric utilities in the Dominion and an affiliate of the Institute. Thsi 1941 meeting will be the second national convention of the industry to be held in Buffalo. Forty-nine years ago, in February, 1892, the National Electric Light Association, predecessor of the Institute, held its fifteenth (semi-annual) convention in the Buffalo Public Library.

The General Convention Committee, which will serve as official hosts to the Convention consists of Colonel William Kelly, president, Buffalo, Niagara and Eastern Power Corporation, chairman; Hermann Russell, president, Rochester Gas and Electric Corporation, Rochester, N. Y.; John L. Haley, president, Central New York Power Corporation, Syracuse, N. Y.; Ralph D. Jennison, president; New York State Electric and Gas Corporation, Binghamton, N. Y.; T. W. Connette, vice president and general manager, New York State Electric and Gas Corporation, Lockport, N. Y.; and M. E. Skinner, vice president, Buffalo Niagara Electric Corporation, Buffalo, N. Y.

Transportation and hotel information will shortly be sent to member companies. It is suggested that reservations be made as early as possible.

Arkansas Association Convenes in Hot Springs

SPEAKERS from without the utility industry voiced recognition of the growing tendency of the public to be unfair toward the industry at the annual convention of the Arkansas Utilities Association, held in Hot Springs, on April 28 and 29.

"We are all in a fair way to be regimented or disciplined by a wrongly educated public opinion," Sam Schweiger, of Fayetteville, field manager for the Arkansas Press Association, said in his talk. "Editors are being awakened to the fact that they must go to work on a well planned consistent public relations program," he said. "As a result of the burdens placed on the press from various sources in recent months and years, newspapers have been somewhat jarred out of their complacent and snug positions."

Col. Willard Chevalier, publisher of *Business Week*, speaking on "Business Under Arms," asserted that the general industry in the country today is the armament industry. Asserting that utilities are entitled to fair treatment, along with all other industry, he pointed out that the vast increase in government expense is being borne by the tax payers, and they are entitled to all the relief they can get, and not needless diversion of tax funds from purposes where they can be better used in the defense program.

Albert S. Johnson, president of the United Gas System, Dallas, Tex., appealed for fair treatment by the government. "It is important that our federal, state and municipal governments be brought to realize that a government must be just as honest and fair as it expects its citizens to be," he said. "No government can expect its citizens to respect and obey the law if it adopts one standard of honesty for itself and another standard for us."

He charged that regulatory commissions can be drunk with power the same as utility executives. "Power is always dangerous when concentrated in one man or group of men."

Grover T. Owen, of Little Rock, attorney for several large utility companies, gave a brief resume of the recent session of the Arkansas legislature as it affected the utility industry.

Maj. Gen. R. E. Truman, commanding officer of Camp Joseph T. Robinson, at Little Rock, Ark., devoted much of his talk on the opening day to urging united effort to carry out the defense program. "It is a moral wrong for labor to make excessive demands when our nation is in grave danger," he said. "It is likewise a moral wrong for capital to expect or require excessive profits in contracts that affect our nation's safety. If there exists a grave emergency, and if it appears to the best interest of the nation, such legislation would, in my judgment, be advisable," he said in discussing proposed legislation for drafting both capital and labor.

D. H. Thurston, El Dorado, manager of the Arkansas Louisiana Gas Company office there, asserted in his annual address that the utilities of the state have adequate power to supply the increased demands that may arise from the locating of defense industries in the state. He said the industry's revenues increased two per cent during the past year, while taxes were up 16 per cent. He pointed out that more than 16,000 persons depend upon the utility industry for their livelihood in Arkansas.

Mayor Leo P. McLaughlin, of Hot Springs, delivered the address of welcome to the delegates on the opening morning. Frank M. Wilkes, Shreveport, La., vice president and general manager of the Southwestern Gas and Electric Company, gave the response.

During the afternoon of the first day group meetings of gas and electric delegates were held. R. E. Thornton, division engineer, Oklahoma Gas and Electric Company, Fort Smith, was chairman of the electric section, and C. B. Wilson, Little Rock, new business manager for the Arkansas Louisiana Gas

(*Continued on page* 76)

Finance and Operating Problems Occupy Exchange Members

"THIS Exchange is a workshop of free speech, free thinking and free expression!" With these words President A. W. Higgins, of Florida Power Corporation, opened the eighth annual conference of the Southeastern Electric Exchange, in the Bon Air Hotel, Augusta, Georgia, on May 1st. In the three days that followed, utility company executives of the Southeast heard outstanding economists and engineers, many of them speaking frankly and "off the record," discuss the problems that confront the country and the industry.

From the President's opening address members of the industry learned that the Southeastern Electric Exchange now has thirty member companies whose gross electric business approximates $190,000,000 annually, serving, 1,750,000 customers in nine states, and reprsenting about one-twelfth of the electric business of this country.

The President made a plea for better publicity for the industry. "Nothing is said in Washington, apparently," he told the conference, "but what it reaches the press, and immediately the world hears about it. But what about when we say anything? How about publicity? What chance have we got? Personally, I think we have one, just as long as free speech lasts, and that is the spoken word. Our executives should be out on the firing line, at service clubs, at any meeting where they have the opportunity of making a talk, telling about this great industry of ours.

Employees Can Help

"Let us get our employees, each and every one of them acquainted with the facts of what is going on today. It won't be long, with the present pressure, if continued, before all of us had better brush up on civil service examinations. I think the employees might just as well be told frankly and fairly that if that is what they want, it can certainly be easily accomplished. But I don't believe it. I still have the greatest of confidence in our people, in our business men and in our industry.

"I believe that if you will pass this idea along, that if you will get down in that boiler room, get out in that construction department, get into your sales meetings, we can make some headway. I don't suppose one of you in this room is under the wage hour act. It is incumbent upon us to see that we continue to put in more than the minimum hours in our work. And if you want to do any sitting, my suggestion is that you do it after the forty hours, but get as many of those forty into your own organization through association with your employees as possible, and inspire them and lead them. And let them go out to their associations and spread that gospel.

"There are some 275,000 employees in this industry in the United States, and it is not such an awful job to get them to do some talking for themselves. We must inspire them. They will get inspired themselves. They know the business; in many respects, better than we do. But don't let them keep it to themselves. Let them spread it."

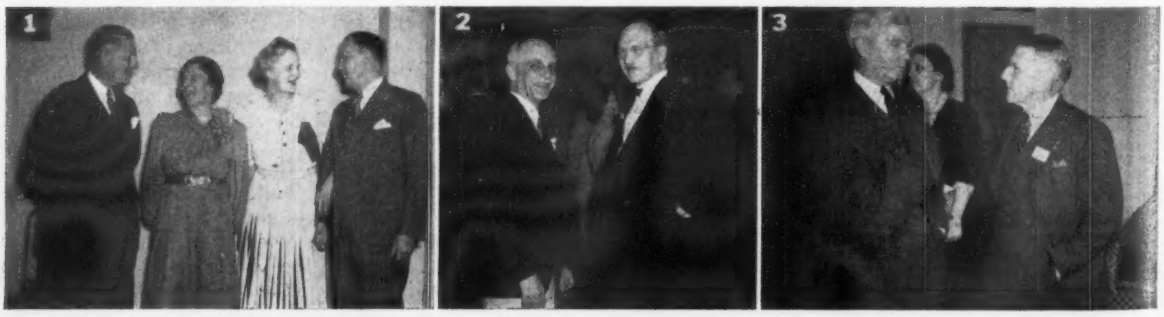
The first business session included addresses by C. W. Kellogg, chief consultant, heat, light and power, Office of Production Management; W. E. Mitchell, vice president and general manager, Georgia Power Company; and Clifford Townsend, special adviser, Labor Division, Office of Production Management. Also presented at this session was a report on the activities of the Engineering and Operation Section by its chairman, Lewis Payne, president, Eastern Shore Public Service Co., Salisbury, Md.

Noted Economist on Program

Featured speaker at the dinner meeting Thursday evening was Sir Charles Morgan Webb, president, London and Suburban Press, London, England, and eminent authority on monetary economics. His subject was "What Will Happen to Your Money?"

Sir Charles informed the dinner group that by the end of the present war the United States will have 95 per cent of all the gold in the world "buried in vaults in this country."

(1) Left to right, Thomas Fuller, Westinghouse, Atlanta, Mrs. L. V. Sutton, Mrs. Fuller and L. V. Sutton, president, Carolina Power & Light, Raleigh. (2) C. S. Thorn, vice-president, Birmingham Electric, and W. E. Mitchell, vice-president, Georgia Power, Atlanta. (3) Chas. E. Ide, president, East Tenn. Light & Power, Bristol, and F. A. Mathes, chairman of the board, Tide Water Power, Wilmington, North Carolina.



Declaring the present generation has learned to know gold only through jewelry and teeth-fillings, the British economist asserted that within three more generations all of this country's gold will have lost its value.

He traced the monetary problem that confronted Britain in 1931, and showed that by careful economic manipulations, plus the adoption of "baloney money," the country managed to attain new pinnacles of prosperity during the 1931-39 period that reached a new high the year the war started. In the 1931 period the nation's income was $13,000,000,000 as compared to $27,000,000,000 in 1939.

"Since 1929 the United States has had a chronic fear of inflation," he said, adding that this fear was not evident in Britain because the government had taken up the responsibility of not allowing inflation.

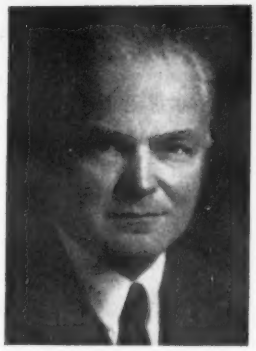
The United States, he said, has allowed the monetary problem to get out of its hands.

He pointed out, as illustration, that the coin and notes amount to eight billion, while banks have a checking business of 26 billion.

The banks have so much money to check out and loan to industry that the government can not control it, therefore there are continuous ups and downs in business caused by more money in circulation than industry can match in production.

Kenneth Crawford, Washington correspondent for PM Newspaper, opened the Friday morning session, telling the conference that the United States is faced by war or by a regimented economy not unlike that of Europe.

He expressed belief that this country could not live in a world in which Germany holds the upper hand, and he asserted further:



C. C. Curtis, president, Savannah Electric and Power Co., was elected president to succeed A. W. Higgins, president of Florida Power Corp., St. Petersburg.

"We would have to adopt measures to live with Hitler that would make the New Deal regulations look mild in the greatest degree."

He said there won't be much difference between government control of business in this war than was experienced during the World War.

Turning to the present conflict, he said he believed that Great Britain would lose the Mediterreanean because Turkey has been undermined by German victory in Greece, and the possibility of Morocco becoming a German colony.

"The United States is Great Britain's only hope," he added.

Other speakers addressing this session, whose papers are abstracted elsewhere in this issue, included F. J. McDiarmid, Investment Research Dept., Lincoln National Life Insurance Co., Fort Wayne, Ind.; Charles W. Smith, chief, Bureau of Accounts, Finance and Rates, Federal Power Commission, Washington; E. R. Dunning, vice president, N. W. Ayer & Co., New York City; and W. H. Burke, vice president, Ebasco Services, Inc., New York City. Reports of the Accounting Section and the Sales Section were presented by the chairmen of these groups, P. R. Williams, comptroller, Virginia Electric & Power Co., Richmond, and R. B. Roberts general sales manager, Florida Power & Light Co., Miami.

One of the outstanding features of the conference was an inspirational address by Hjalmar Baukhage, NBC commentator on foreign and domestic affairs, Washington. The theme of his talk, presented at the annual banquet Friday evening, was that if the United States is going to stay in business, Democracy must be resold: first, in the home market, and then abroad. Approximately 375 persons were gathered in the Bon Air's large dining room to hear Mr. Baukhage.

Need to Resell Democracy

"In order to meet the dictators," he told them, "whether on the field of battle or in the factory, the people have permitted the government to adopt certain methods necessitated by the emergency. In our program to defend democracy, we have sacrificed some of the processes of democracy.

"The first reason why we need to resell democracy, is to keep the people from forgetting these normal processes of representative government which have been temporarily laid aside.

"The second important reason goes right back to the first principles. I do not have to tell you that you can not expect to keep up sales if you stop your advertis-

(1) Donald M. Wilkins, sales promotion manager, Bon Air Hotel, J. W. Hancock, president, Appalachian Electric Power, Roanoke, and John W. Talley, executive secretary of Exchange, Atlanta. (2) W. P. Molette, General Electric, Charlottesville, and J. W. Johns, chairman of board, Virginia Public Service, Charlottesville. (3) E. H. Ginn, General Electric, Atlanta, C. B. McManus, assistant operating manager, Georgia Power, Atlanta, E. S. Fitz, general manager, electric department, Virginia Electric & Power, Richmond, and C. C. Curtis, new Exchange president.

ing. The belief in democracy has to be renewed with each generation, or some other product is bound to push it off the market."

Democracy does not fail—anywhere on earth, he said. "It is the people who fail democracy—fail it because they refuse to realize that they must make as great an effort to nurture the growing tree as our fathers did when they broke the soil to plant it."

An intensely interesting address was presented by Professor E. H. Schell, Department of Business and Engineering Administration, Mass. Institute of Technology, Cambridge, on "Industrial Management and Employee Relations." Because of its frank nature, this address was necessarily "off the record." Other speakers at the concluding session on Saturday morning were Dr. William P. Jacobs, chairman, So. Carolina Council for National Defense, Clinton; and R. Paul Smith, president, Potomac Edison Company, Hagerstown, Md.

Reports at this session were heard from J. W. Talley, executive secretary of the Exchange, and J. M. Stafford, assistant advertising manager, Georgia Power Company, and chairman of the Employees Activities Committee.

In the election of officers for the new administration year, C. C. Curtis, president of Savannah Electric and Power Co., was selected to head the Exchange, succeeding Mr. Higgins. Other officers elected were: first vice president, L. P. Sweatt, vice president and general manager, Mississippi Power Co., Gulfport; second vice president, Rex I. Brown, president, Mississippi Power and Light Co., Jackson; and third vice president, R. Paul Smith, president, Potomac Edison Company, Hagerstown, Md.

(1) J. F. Bailey, president, Georgia Light & Power, Valdosta, and T. C. Erwin, district manager, Florida Power Corp., St. Petersburg. (2) Mr. and Mrs. L. T. Smith, sales promotion manager, Gulf Power, Pensacola. (3) A. D. Hammond, Birmingham, and G. C. Marchmont, Atlanta, both of Graybar. (4) H. K. Dewees, Hotpoint, Atlanta, and C. E. Greenwood, commercial director, Edison Electric Institute, New York City.

INSTITUTIONAL INVESTOR'S VIEWPOINT ON UTILITY FINANCE

By F. J. McDiarmid

Investment Research Department, Lincoln National Life Insurance Company, Fort Wayne, Ind.

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

THERE are certain aspects of public utility finance which are a cause for concern on the part of investors in utility bonds.

To tell the truth I was rather at a loss as to the degree of frankness with which I should tackle these phases of my subject. However, in the course of my preparation for this talk I ran across an address given back in the year 1930 to a life insurance gathering by the president of a large electric operating company. It was a forthright talk which did not hesitate to tell the life insurance men wherein their errors lay, and it has stood the test of the last eleven years much better than some of the other talks given to the same gathering. Let me quote a choice extract from it.

"Insurance companies must take only the highest and most conservative class of loans and investments. There is no place in this game for speculation. The conservative insurance company in placing loans should always require an annual reduction in the amount borrowed. The borrower's ability and willingness to make an annual reduction in his indebtedness is usually a good test of the quality of the loan. Insurance companies do not want 'riders' any more than a bank does. Regardless of the value of real estate or other security there should be an annual reduction in the loan. Sound business and banking practice requires it."

Now maybe this gentleman didn't mean exactly what he said. Maybe what he meant was that all debts except utility debts should be paid down systematically. The reason I think this may have been the case is that at that time the mortgage bonds of his own company contained no provision for retirement through a sinking fund. His company still has outstanding some debenture bonds maturing in 2022 but with no provision for their systematic retirement in the interim.

Considering the trends within your electric industry to which I have already alluded why should any bond buyer be concerned with bond indenture provisions calling for the systematic retirement of a bond issue through a sinking fund. The answer is that the only certain thing about the future is that conditions will change. It is the record of history that no industry has remained prosperous forever—they expand and prosper, then level off and decline. It is sad to speak thus but it is true. Such has been the experience of the railroad industry,

the telegraph industry and the horse collar industry. Did any industry ever appear more permanently and securely fixed than the railroad industry of a few decades ago when railroad bonds were being sold to run for 100 years with no provision for amortization in the interim. Now one third of all rail bonds are in default and a good many more await only a medium sized depression to go over the brink. Usually in an industry profits level off and decline before other factors such as gross business or total investment do so. Sometimes in rare instances a declining

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EFFECT OF DEFENSE PROGRAM ON SOUTH'S ECONOMIC DEVELOPMENT

By M. Clifford Townsend

Special Adviser on Agriculture and Labor, Office of Production Management, Washington, D. C.

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

UP TO March 31, the total value of defense contracts and project orders was $13,287,163,000, not including those involving less than $10,000. The prime contracts totalled $10,998,643,000. Of this sum, $785,954,000 went to fourteen Southern States—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia, which states have approximately a fourth of the total population.

The war contracts through March amount to about $100 per person for the country as a whole. For the fourteen Southern States, the corresponding figure is about $26—or 26 percent of the national average.

The war contracts have been awarded very largely in the main industrial areas. In the Northeast—north of Tennessee—North Carolina and east of the Mississippi River—we find 74 percent of the value of manufacturers and 70 percent of the war contracts. In California and Washington, contracts have been placed in excess of manufacturing capacity. These two States in 1939 provided 6 percent of the value of manufactures but in January had 18 percent of the contracts; whereas the 14 Southern States with about 12 percent of the value of manufactures in 1939 had only about 7 percent of war contracts. In all other States, chiefly agricultural, contracts are also relatively less in relation to their manufacturing capacity. In this group, we find 9 percent of the value of manufactures in 1939 and 5 percent of the defense contracts.

Regardless of all these statistics, I am more interested in the beneficial effects wider distribution would have on the South and other sections—how this would strengthen our home front. I am concerned, too, with the advantages the sections outside the Northeast and Far West could offer the whole defense effort. These advantages involve available manpower and resources. The effects would involve solutions of farm problems and under-employment.

The boost given by defense industries would help considerably a change from a one-crop farm economy—cotton in the South and wheat in certain sections of the Middle West, for example—a change that many farmers and farm leaders have advocated as of utmost importance, especially now that the loss of export outlets and mechanization have caused distressing surpluses of men and those products. The extra money from defense work can encourage the shift from the unstable, undiversified farming system into which factors like lack of adequate funds or intense effort to keep going forced many farmers.

The Southern economy has been primarily the cotton system that has determined income and social structure. When loss of exports cut the cotton market, the South suffered badly. Efforts are going forward to improve agriculture of this great, and potentially greater, area. Dairying and livestock production and other diversification are being encouraged as essential if these people are to get their fair share of opportunity. But many of them are strapped. They are in a corner. Many see that their salvation lies along such paths, but they do not have the money to make the change-over.

I hazard the opinion that from one-fourth to one-third of our cotton farms are no longer needed to produce cotton for the present

(1) T. A. Gibson, vice-president, Georgia Power, Augusta. (2) Lee C. Goodwin, new business manager, Durham Public Service, and E. E. Rawl, Carolina Sales Corp., Greenville, S. C. (3) T. J. Fleischer, Walker Electric, Atlanta, and Edward Kerschner, General Cable, New York City. (4) J. M. Robertson, advertising manager, Florida Power, St. Petersburg, and Fred Holz, "Reddy Kilowatt," New York City.

market, because of technological advances and loss of foreign markets. If they can be changed to different crops, they, the South, and the Country will benefit.

But what will happen to the men thus displaced? Some would still be needed on farms but many—perhaps as many as a million—would be available for other pursuits or would be out of work. This manpower is available for defense activity. It is a part of the home front—a good part if happily employed; a liability if unemployed, and a possible prey to disease and disaffection.

The present war contracts in the South touch only a relatively small part of this basic problem. The contracts in Southern states of about 800 million dollars, if taken as equivalent to "value of manufactures," equal approximately 150,000 wage and salary workers at present wage rates. If we consider that defense manufacturing activity might stimulate the employment of another 150,000 persons in related occupations, it might be said that the present defense program amounts to employing perhaps 300,000—400,000 persons in the South. This is much less than half of the total industrial outlet required if the million or so persons are ultimately to be taken out of cotton into other lines of work.

On that basis, the cotton South would have 12 percent of the contracts instead of 7 percent, and this would mean an additional 600 million dollars, or a total of around 1,400 million dollars. This would provide employment in manufacturing activity for wage and salary people amounting to perhaps, 250,000, and if as much more employment is created in associated or indirectly affected lines, we would have employment for about 500,000 to 600,000 persons.

Let me emphasize two points here. One is that the ramifications of placing defense contracts in the South or West or elsewhere outside the best farming regions and the present areas of concentration will reach far beyond the immediate locality. Secondly, we do not wish to stress that it is the South against the North or the West or the East—it is not a matter of each section trying hard to seize an amount of gravy. This is a national, not a Southern, or Eastern, or Northern, or Western project.

My whole reasoning revolves about this point: Of using the defense program to help every secaion as much as possible. An enlightened self interest is the highest form of altruism.

KEEPING THE UTILITY COMPANY IN BALANCE

By R. Paul Smith

President, Potomac Edison Co., Hagerstown, Md.

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

SPEAKING of the industry in the past, we have seen the utility in various business cycles. We can recall the early years when our service was under accepted by the public, when we were struggling to have the public give us a reasonable acceptance of what we offered and to pay a reasonable price for it, and be willing to place a reasonable amount of money in the business. Still looking back not quite so far we have seen this effort succeed, and the industry pass into a period which might be termed one of over acceptance, over confidence, over optimism on the part of the public; a time when they were willing to put too much into our industry and we were, to some extent, willing to take too much out for permanent public acceptance.

This resulted in the upward phase of the cycle, trending downward again to such extent as to render our business somewhat vulnerable to those who would take advantage of such a situation. Public opinion almost entirely dictated both phases of the cycle.

Our nation is confronted with the extreme emergency of preparing for national defense in a world already at war. Our industry is such that it occupies a key position in any national emergency and surely the present one is no exception. We find ourselves over regulated and viewed with a cold unsympathetic eye by National Government, supported to some extent by public opinion, yet we are expected, despite such circumstances, to carry our full load and fill our very important position in this the greatest national emergency in our history. Needless to say this is a difficult assignment and, perhaps, the load could not be carried except by the kind of tested, tried, and experienced peo-

(1) C. B. Rogers, Atlanta, and Bruce Fleming, assistant to president, Pittsburgh, both of Edwin L. Wiegand Co. (2) J. B. Stepp, division sales manager, Carolina Power & Light, Asheville, O. O. Rea, Westinghouse, Atlanta, Wade Gallant, Westinghouse, Raleigh, and H. B. Robinson, manager of engineering and operations, Carolina Power & Light, Raleigh. (3) In front: Sam Guess, General Electric, Tampa, and Mrs. W. P. Hammond, Atlanta. Back row: B. M. Gatling, Jr., Westinghouse, Atlanta, Mrs. Gatling, and L. M. Shadgett, vice-president, Georgia Power, Athens.

(1) B. G. Duncan, advertising manager, Orlando, A. H. Bruning, commercial manager, Orlando, R. R. Brown, district supt., Avon Park, all of Florida Public Service. (2) T. W. Moore, General Electric lamp department, Atlanta, J. M. Stafford, assistant advertising manager, Georgia Power, Atlanta, and T. S. Sloan, vice-president, Georgia Power, Columbus. (3) H. B. Robinson, manager engineering and operations, and S. Paul Vecker, vice-president, both of Carolina Power & Light, Raleigh.

ple who go to make up our industry.

I feel that the period through which we are now passing is crucial—fraught with grave danger, the gravest point of which is a lack of full appreciation on the part of us all, both the public regulatory bodies and ourselves, of the real facts. We are thinking that things are going along pretty well, and while many of us may have no direct war industry we are enjoying a swift general acceleration and stepping up in all lines of industry, and those companies which serve centers of strictly war industry are showing exceptional increases in the electric service needs of their customers.

Our industry is making commitments for large increased plant capacities in generating stations, substations, transmission and distribution lines. The capital is forthcoming at reasonable terms, labor is making demands and receiving almost all it asks for, taxes are growing by leaps and bounds, depreciation reserves and fixed charges will necessarily show large increases because of increased facilities. Nothing is said or thought about, in the public mind at least, of meeting these conditions in any other way than

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THE UTILITY SALES PROGRAM

By R. B. Roberts

General Sales Manager
Florida Power & Light Co.,
Miami, Florida

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

FOR THE PAST twelve years, we have been selling in a distinctly buyers' market and, strangely enough perhaps, the greatest progress recorded in the entire history of utility selling has been recorded during that time. During that period, economic changes have been slow and, consequently, have not been too difficult to anticipate and follow. For the first four years, we fought and fought hard to retain the business that we had—especially that business that had been secured in the silk shirt sellers' market when costs of operation meant nothing to the customer.

In those days, it was not even a question of selling a new range or water heater, but rather of keeping existing equipment on the line. Many residential sales departments were reorganized to include men to sell the value of the many advantages of the use of the service and to instruct individual customers, singly or in groups, in the more economical use of equipment, rather than to sell equipment itself.

This was perhaps, the first step in the residential market toward actually selling electric service as such, and at the same time, the first step in planned mass selling. You know how well it worked. Mass selling was extended. Dealer cooperation tended to replace dealer competition. All this, supplementing our own direct sales effort, greatly stimulated by drastic rate reductions, gradually built up the use of our residential customers to an all-time high.

The extent to which this trend toward mass selling by the utility has been carried on our property is clearly illustrated by the fact that during 1940 an average of $73.50 per customer in appliances was sold to our customers, as against a national average of $35 per customer, and that 96% of the sales were made by dealers.

House-to-house solicitation by utility service salesmen contributed tremendously to the successful progress of mass selling especially in the buyers' market where changes in customers' buying power were slow and where minds were changed or made up gradually. But in today's and tomorrow's market, changes in buying power are and will be so rapid that house-to-house solicitation by a comparatively few residential service salesmen, who will be increasingly hard to get and to hold, will be entirely too slow a process to keep up with the parade. At the same time, this is a golden opportunity to sell the low use customer, who may no longer be a low income customer, on a wider use of our service, before others sell him silk shirts and other luxuries through mass appeal to keep up with the Joneses. We must step up our selling to the tempo of the times.

We cannot repeal that proven law of business that selling is essential, both in good times and bad times, but we must take every advantage of these changed conditions. It is our observance that this may be done by changing the emphasis, if possible, from

(1) W. H. Tyler, division manager, East Tenn. Light & Power, Elizabethtown, Mrs. Tyler, Mrs. J. H. Grubbs, J. M. Beauchamp, Electric Advisers, New York City, and Joe H. Grubbs, secretary and treasurer, East Tenn. Light & Power, Bristol. (2) In front: Mrs. H. L. Gardner, Roanoke, Mrs. H. E. Kirchner, Bluefield, and Mrs. J. E. Wright, Kingsport. Back row: Ward R. Schafer, Hotpoint, Chicago, and J. W. Hancock, president, Appalachian Electric Power, Roanoke. (3) Mr. N. E. Drexler, president, Tide Water Power, Wilmington, and Mrs. Drexler.

utility direct house-to-house selling to utility mass selling. More emphasis would be placed on sales promotion and advertising, more on dealer sales development and more on home service work. By so doing, we may not only consolidate our past gains and make even more progress now but also make an appreciable saving in expense against the inevitable depression, when every available sales dollar will be needed to hold our own and when, with changed tempo, emphasis may be shifted back to the direct personal approach.

The commercial market presents a most interesting picture. For instance, the large majority of customers in this classification are small store or shop keepers who, like low-use residential customers, have received very little attention from the utility sales representatives. Yet it is this small merchant whom the creative utility salesman can help most in developing a more profitable use of electricity. This is very clearly shown in the blind way that thousands of small merchants have grasped fluorescent lighting from the hand of ill-advised fixture salesmen. These customers, by a small per cent increase in business, will increase their profits and it is almost certain that their business will be appreciably increased. There is hardly one but that could profitably double his use of electricity at rates which are compensatory. Here then is a tremendous market for profitable plus business, made ripe by present conditions, that challenges almost every member company.

BASIC FACTORS OF ANY EMPLOYEE RELATIONS PROGRAM

By J. M. Stafford

Asst. Advertising Manager
Georgia Power Company
Atlanta, Ga.

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

CONSIDERATION of the importance of the *individual* employee in the operation of an electric light and power company certainly is something not altogether new. But I believe we may agree that now—*right now*—more than ever in the past, the individual worker has taken new and deserved prominence in our thinking and planning.

It is with considerable pleasure that I report to you the inauguration of employee information programs in several of our member companies. These programs with which I am familiar vary to some extent in specific plans of operation but, generally speaking, they are all being operated upon the assumption that the employee bodies need to be informed—need to be kept informed—regarding the problems, policies and plans of their companies.

Among the companies which have inaugurated such programs within recent months are: Alabama Power Company, Florida Power Corporation, and New Orleans Public Service. (And I beg your indulgence in my statement that the Employee Information Program of the Georgia Power Company is completing its fourth year of operation with meetings to be held during this month. We believe sincerely that the activity is doing a better job for us today than at any time since it began).

At the risk of appearing to be pedantic, I should like to outline what seem to me to be the four general factors of importance in the inauguration of any employee relations program. They are not simply my own opinions, but ones I have observed in my own company and ones to which authorities in employee dealing have pointed.

1. **To Improve Morale.** It should be remembered that the average employee is a "neutral" individual, albeit, somewhat lukewarm. He is neither antagonistic nor enthusiastic.

Naturally, it is desirable to change the attitude of the employee who says: "Who, me? I just work here!" Or the one who says, when asked some question about his company's business: "Well, I wouldn't know about that."

Recognition should be taken of the fact that the building of esprit de corps, improved morale, is in-

(Continued on page 72)

(1) J. A. Farr, purchasing agent, Appalachian Electric Power, Roanoke, J. M. Richardson, president, Richardson-Wayland Electric Corp., Roanoke, and Robert H. Giedd, new business manager, Florida Power, St. Petersburg. (2) Mrs. H. F. Church, T. A. Busby, assistant to president, South Carolina Power, and Mrs. Busby, all of Charleston. (3) J. E. Wright, general superintendent, Kingsport Utilities, Mrs. Wright, and J. T. Nee, Hotpoint, Atlanta.

WHAT OF POST-WAR CONDITIONS?

By W. H. Burke

Vice President, Ebasco Services, Incorporated, New York City

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

EVERY ONE seems to be agreed that electricity is the keystone of the national defense program. They are even going so far as to say that without an adequate supply of that controversial product the fulfillment of the defense program would be inconceivable. So, after all, there may be something to the old saying that "sweet are the uses of adversity." What with all the solicitous concern being shown about the adequacy of our facilities and their protection against sabotage (the kind that is accomplished with bombs) we in this industry may, after all, end up as just another bunch of softies.

I am not suggesting that our situation is any laughing matter, far from it. However, when you come to think about it, the situation in which this industry finds itself would be funny if it wasn't so serious. Here is an industry that probably has done more to expand its plant, improve its product, extend its use, lower its cost to the customer and contribute to the improvement of social standards than has any other industry in the whole history of the world. The average daily cost of electricity used in the American home is so insignificant that if the service were given away, the individual consumer would spend the equivalent of its cost on other things without even realizing where the money had gone. What he would save each day if he received his electricity free would be enough to pay the Federal, State and local taxes on one package of cigarettes, assuming that he lived in New York City where these taxes amount to nine cents per pack. Or, if he was a non-smoker, he could buy three pints of gasoline with the savings he would realize if he got his electricity for nothing, or if he were a heavy drinker he could buy one glass of beer. Again, the cost of the central station electricity used by industry averages less than two percent of total industrial costs. And yet here is a peanut that has been ballooned into a water-melon and has for years past been pic-

(*Continued on page 70*)

Resolution

Whereas, our great United States, with its cherished principles of freedom, is endangered from within and without, and

Whereas, our electric industry was founded under this democratic system and thereunder developed and expanded to the extent of bringing to the people of this country the highest commercial development and standards of living that the world has ever known, and

Whereas, realizing the immense debt we owe to our country and to those who visioned, founded, developed and expanded the electric industry under our free American system for the benefit not only of our own people but all mankind, and sincerely believing it could not have been brought about and would not continue its proper growth under any other system;

We, the Southeastern Electric Exchange, at our Eighth Annual Conference hereby resolve:

That, we as American citizens who have inherited this trust of further developing, expanding and carrying on the electric service industry under our democratic system, re-dedicate ourselves and our industry to the defense of the United States and the principles of freedom under which it was founded and has grown, and to the furtherance of the electric service industry which was created and developed under it; and we especially offer a continuance of our full cooperation, ability and efforts to Local, State and Federal Governments, and allied civilian groups, in the defense program now under way and to the extent of fully protecting our American system from all enemies from within and without, who would destroy or seriously impair our democracy.

(Signed) S. P. VECKER,
Chairman Resolutions Committee
C. B. McManus
N. E. Drexler.

Left to right: W. O. Turner, president, and G. C. Rawls, vice-president, both of Louisiana Power & Light, Algiers, J. D. Stietenroth, treasurer, Mississippi Power & Light, Jackson, John W. Talley, executive secretary of Exchange, Atlanta, and Rex I. Brown, president, Mississippi Power and Light, Jackson.

PUBLIC OPINION

By E. R. Dunning

Vice President, N. W. Ayer & Son,
New York City

Summary of an address presented at the eighth annual conference of the Southeastern Electric Exchange, in Augusta, Georgia, May 1, 2 and 3, 1941.

PUBLIC OPINION is the beginning and the end of public relations. Public opinion is like the air. It's always with us. You have it whether you like it or not. Sometimes the air is cold—sometimes hot. Modern ingenuity conditions it—warmer, cooler, moist—as you want it. Certain forces condition public opinion in like manner. And while a human being can live two or three minutes without air, they can struggle along a long while with impure air. So with a corporate body. If public opinion is against it wholly, it will surely die. It can struggle along unhealthily in poor public opinion. It can thrive and blossom and do its best work when public opinion is properly conditioned for its comfort.

There are three controls to every business. The control of the product or the service is entirely in the hands of the manufacturer. He can make it good, or bad or magnificent or whatever he pleases. Then, because he has to get it out to the public, a second control confronts him—that of distribution. He has to make his product available because we have grown too far and too big to rely on the old mouse-trap-walk-through-the-woods theory. The control of distribution requires proper relationships with the trade, for your dealing with proper profit protection. Then when the manufacturer has these two controls he is confronted with a third. A third that makes or breaks the other two, and that is our old friend public opinion. If he hasn't got public opinion on his side, the magnificence and general utility of his product and efficiency of his distributive system might just as well have never been born.

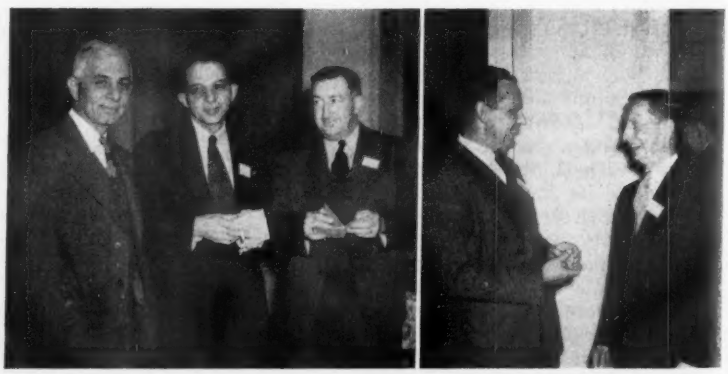
Mass production and mass distribution mean little without mass demand, and mass demand cannot exist without favorable mass public opinion. How do you go about getting favorable public opinion? First of all, you have to start with the intent to try to get it—assuming that you deserve it—your product or your service has to be right or as near right as you can make it, and your first job of having favorable public opinion starts with your own people.

Our client, the American Telephone & Telegraph Company who, thank goodness, has a standard of favorable public opinion that is widely envied by big business, feels that it starts within their own organization. Mr. Arthur W. Page, vice president of The American Telephone & Telegraph Company, has announced succinctly a policy that is based on their belief that anybody who does business with the public, is in a public business and subject to regulation by the public in many ways.

The public lay down the rules for its service, partially in laws and partially in public opinion which at any time may be made into law. A bit of reflection will show you that today's complaints are the regulatory laws of tomorrow. Mr. Page, who, in our estimation, is pre-eminent in his clear grasp of the problems of public relations, in his characteristically modest way, set up a program for any company and I would like to read it to you.

1. A top management that has analyzed its overall relation to the public it serves and is constantly on watch for changes in the public desires.
2. A system for informing all employees concerning the general

(*Continued on page 70*)



Left to right: E. F. Pearce, division sales supervisior, Atlanta, M. E. Mann, division sales supervisor, Columbus, and B. F. Billing, Jr., division auditor, Columbus, all of Georgia Power. At right, A. C. Herron, assistant auditor, St. Petersburg, and L. B. Lovett, division manager, Ocala, both of Florida Power Corp.

Florida Contractors Meet

Hear industry leaders discuss the electrical industry's preparedness to meet the defense program's requirements.

THAT the electrical industry in the United States has girded its loins for war was soon apparent as well known speakers delivered their messages to 150 delegates of the Florida Association of Electrical Contractors and Dealers, which met in Tampa, Florida, April 7-8. Before the first day's session had ended, a resume of the confidential information brought to the meeting disclosed that the electrical industry was probably better prepared for the emergency than any other group.

Frank J. Gannon, general manager, Tampa Electric Company, delivered an official address of welcome, following a formal greeting from Mayor R. E. L. Chancey.

Mr. Gannon discussed both the good and the bad sides of war and national defense contracts. He called attention to a law which prohibits companies from hiring men to check aliens and suspected saboteurs in labor groups but said that true Americans were watching and could be expected to come through at the proper time. Contractors who encounter suspicious circumstances in their work are duty bound, he said, to report these suspicions to the proper authorities.

Some confidential information regarding rules of the Federal Power Commission to prevent attacks at vulnerable points at power plants was discussed.

Frank J. Gannon, general manager, Tampa Electric Co., welcomed the contractors to Tampa. With his timely comment on the national defense program, he "keynoted" the contractors' conference.

Mr. Gannon characterized the present period, seemingly an interim of emergency prior to actual war, as the most dangerous, and a period when all must watch closely. If war is declared, he said, the army or the navy will take over.

The period of expansion for electrical contractors, he said, had its good and bad points. Many defense contracts are headaches, due to difficulty of proper bidding, government specifications and taxes. Labor he viewed as an increasing problem of the contractor and said that after the emeragency some of the labor drafted into the industry, which would not gain full experience, would probably be out of work when it is over. He said that contractors will probably be faced with the problem of "curb stone" mechanics, who with a screwdriver and pair of pliers will set themselves up in the business. He said contractors can do much to eliminate that type if they start in time.

He said that more adequate wiring programs had done much to advance the use of electricity and, along with defense needs, building booms had increased the importance of the contractor and doubled and tripled his labor demands.

The present prosperity and expansion could not possibly continue indefinitely, he said, and surmised it would behoove the contractor who is alert to think of the deflation to come. "Your high income," he said, "will not continue and unless you watch all details

Several of the leaders of the Florida Association of Electrical Contractors and Dealers are shown in these photos: left to right, S. C. Reddick, chairman relations committee, Jacksonville; W. O. Henderson, president, Jacksonville; W. S. Monroe, vice president, Tampa; D. B. Clayton, executive committeeman of N.E.C.A., Birmingham; and R. C. Bigby, secretary and treasurer, Tampa. Mr. Bigby succeeds F. J. McGinnis, resigned.

At top, reading from left to right, R. B. Roberts, general sales manager, Florida Power & Light Co., Miami; Archer K. Jones, assistant to president, Florida Power & Light, Miami; J. Arthur Turner, president, Tampa Armature Works and Turner Electric Works, Jacksonville; J. M. Moore, National Electric Products, Atlanta; J. A. Ingram; O. R. Searight, Square D; Troy Brown, Raybro Electric, Tampa; S. E. Cornelison, Haines City; B. A. Bryant, Columbus Metal Box, Atlanta. Directly at right are M. A. Montenegro, president, Florida Institute of Accountants, who addressed the convention, and J. A. Banton, illuminating engineer, Tampa Electric Co.

of your business and your credits, you'll have some trouble."

"The Electric Utility Industry's Preparedness for National Defense," was the topic of an interesting and educational address by R. B. Roberts, general sales manager, Florida Power & Light Co., Miami.

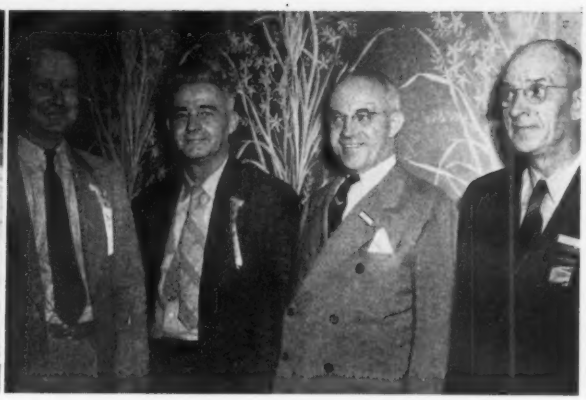
The electrical utility industry is fully prepared to meet any emergency of national defense or war, according to Mr. Roberts, who illustrated his talk with slides. He said that at the close of 1940 there were 42,000,000 kilowatts, equivalent to 56,000,000 horsepower, available in the United States. That figure, he said, was greater than the combined power resources of England, France and Germany.

"The first line industry in the defense program," Mr. Roberts said, "is the power industry. It is clearly the big No. 1 job of the electric utility industry to supply this power cheaply and adequately —as, when and where needed. Its present ability to do so is the true measure of its preparedness.

"If this essential industry is so prepared," he continued, "then defense industries may be widely separated. There will be no delay in production, awaiting design, manufacture and installation of extra power plants.

"If our industry is prepared," Mr. Roberts continued, "hundreds of thousands of sorely needed trained mechanics, hundreds of thousands of square feet of essential manufacturing floor space, thousands of machine tools and hundreds of millions—perhaps bil-

Directly at left, Laurence W. Davis, general manager, N.E.C.A., and O. V. Scott, former president of the state association. Below, reading from left to right, H. E. Richardson, Sarasota; E. C. Range, Okonite Company; J. J. Murphy, Sarasota; H. H. Hayes, Hayes Electric, St. Petersburg; W. P. Siebert, Pinellas Electric Co., St. Petersburg; and A. J. Keesler, Florida Power & Light Co.



At left above, C. R. Long and J. A. Akerman, both of Westinghouse, stage a private demonstration for F. J. McGinnis, former secretary of the state association, and C. C. Colvin, contractor, Boca Raton. At upper right, left to right, Joe Bragg, Florida Electric Supply; S. W. Shaw, Shaw Electric Co.; J. M. Moore, National Electric Products, and A. C. Gibson, Cutler-Hammer. Directly at left, Ellis Knox, chief electrical inspector, R. O. Bushnell, electrical contractor, both of Miami.

lions—of dollars that would otherwise be required to build power plants, will be released to build planes, guns, tanks, ships and other implements of defense.

"I am sure that everyone in this room will be thrilled with the statement of the following fact:

"The electric utility industry is fully prepared to meet all power requirements of the national defense program."

Mr. Roberts said that by the end of 1941 more than 46,000,000 kilowatts would be available and that plant capacities exceeds the demand by at least 30 per cent. This reserve capacity is estimated at 10,000,000 kilowatts.

All of this is available to all parts of the country by the existing grid system of high lines which interconnect the various plants. Most plants in addition were capable of carrying a considerable overload and additionl power can be obtained from each plant by rearranging the time of individual peak loads by agreement with individual customers.

In the network of power lines in the country, Mr. Roberts said, in 1940 there were 83,000 circuit miles in this network of 60,000 volts or over. If voltages down to 11,000 were included it would total 300,000 miles or more than twelve times around the earth.

"There is no place," Mr. Roberts said, "except in the desert and mountain regions, where tremendous blocks of power for the defense program could not be made immediately available. This tremendous power network is an exclusive American institution. No place else on the face of the globe is there anything which even approaches it in extent or completeness, for there is no place else in the world where private enterprise, for the past generation, has been sufficiently free to develop such a triumph of public service."

Public Housing Discussed

Major M. J. Mackler, of the Tampa Housing Administration, made a talk on the first day, and outlined to the contractors the value to them of the slum clearance projects. He said the housing movement was new and had many new problems coming up, but that besides the electrical contracts awarded in the building that many other benefits accrue to the electrical contractors. For instance, Major Mackler said, many of the tenants are learning to use electrical appliances for the first time and many of them are servants, and in many cases the wishes of the servant is respected in the choice of electrical appliances.

"Even demolishing the slum dwellings helps the electrical contractor," Major Mackler said. "If it is demolished, in most cases, a modern building goes up on the site, which has electric wiring. In cases where the owner is allowed to bring his building up to standard instead of demolishing it, it almost always provides a wiring contract.'

C. R. Long, of Westinghouse, gave a talk on troubles connected with fluorescent lighting which was illustrated with a sample board wired up as well as with lantern slides. He explained the workings of starters, transformers and corrective measures used for short-lived lamps, flickering lamps and loss of light through blackened ends.

Clark Taliaferro, of the General Electric, gave an interesting talk on the use of the new wires.

Ellis Knox, chief electrical inspector of Miami, spoke on "An Inspector's Interpretation of Use of the New Wire in Buildings" and "What Miami is Doing Toward Adequate Wiring." He likened some of the requirements of the code in relation to the new wire as a bitter dose which should come first.

"We must take the medicine first," Mr. Knox said, "so we shall start with the new types of wires. Certainly, the most outstanding feature of the 1940 edition of the National Electric Code is the recognition of the new insulating covering for conductors, temperatures limitations of conductors, new table of current carrying capacity, and the increase in conduit fill permitted for rewiring. Heretofore, the code recognized six types of conductor insulations, while the 1940 code recognizes 19 types.

"The Edison Electric Institute,

(*Continued on page 44*)

Southern Lighting Engineers Hold Spring Conference

THE past month has been one of considerable activity among lighting engineers and other members of the Illuminating Engineering Society. In Atlanta, plans are progressing rapidly for the annual convention of the Society which is to be held at the Atlanta Biltmore Hotel, September 22-25.

Atlanta was also the scene of the Georgia Chapter's spring lighting conference, which featured a comprehensive program of modern lighting application, at the Henry Grady Hotel on April 11. I. E. S. President A. D. Cameron was honored at a banquet in the evening.

The Spring Lighting Conference was opened with a discussion on cold cathode illumination led by H. J. Chanon, of General Electric Co., Nela Park. Through the use of demonstration equipment and slides he described the technicalities of illumination from high voltage fluorescent tubing which is frequently used by the sign industry.

The matter of human safety was discussed at length and studies from a recent experiment revealed that the average "let-go" current was many times less than the values used by high voltage tubing. Mr. Chanon's demonstrations included the display of a group of hot cathode fluorescent lamps connected in series with a 15,000 volt sign transformer. Employing an auto transformer to lower the input voltage resulted in a very spectacular appearance of the multi-colored tubes.

A demonstration of a 100-watt fluorescent lamp connected to an old radio audio transformer showed that the tubes could be lighted at higher voltage than under starter operation, but also revealed the damaging effects to the heater coils by very rapid blackening at the ends of the lamp. Mr. Chanon concluded his remarks by stating that the present fluorescent lamp was designed to start and operate at specified voltages and that other voltages would have a tendency to shorten lamp life.

Samuel G. Hibben, director of applied lighting for the lamp division of Westinghouse Electric and Manufacturing Company, Bloom-

A. D. Cameron, of New York City, president of the Illuminating Engineering Society, was honor guest at a dinner dance which concluded a day of activity for the Georgia Chapter, I.E.S. Directly above, some of the members and guests in attendance. At top of page, the speakers' table.

A. D. Cameron

Roy A. Palmer

S. G. Hibben

H. J. Chanon

field, N. J., pictured the world of the future in which visible and invisible light may do almost any job from tattooing to serving as a blanket on a cold night.

Infra-red radiation, invisible long-wave light and invisible ultraviolet rays, are destined to become increasingly important, Mr. Hibben stated. "Glass lenses capable of absorbing the visible radiation but transmitting the infra-red may suggest the placement of a 'black light' radiant heat lamp at the ceiling above the bed at a substitute for one or more layers of blankets on winter nights," he said.

He said that objects coated with an invisible fluorescent powder will help catch thieves because hands and clothes under ultraviolet light will glow brightly if they have come in contact with the powdered objects. Extremely short ultraviolet rays may be used for skin marking or temporary tattooing, in a procedure somewhat similar to sun-tanning controlled by means of stencils.

Other possibilities of the future, Mr. Hibben pointed out, are "mood conditioning" of interiors through changeable colors and a great number of easily controlled light sources, illustrated "talking books," and electrical fireworks.

Mr. Hibben's demonstration of laboratory equipment included about everything from a luminous pin wheel to a high frequency transmitter. After filling the room with sweet odors from a 10 cent bottle of perfume and a vaporizing lamp he demonstrated the colors of various fluorescent lamps and also showed some of the possibilities of mixing the different lamps.

The effect of both near and middle ultra violet radiation was demonstrated by lighting a picture painted with two different phosphors. The energizing of fluorescent lamps held in open air was accomplished by his short wave broadcasting set and Mr. Hibben concluded his dramatic demonstration by holding up glass balls that gave off luminous vapors.

Roy A. Palmer, of Duke Power Company, I. E. S. vice president of the region comprising Georgia, Florida, Alabama, North Carolina, South Carolina, Tennessee, Mississippi and Louisiana, discussed I. E. S. activities in the southern states. He discussed the qualifications necessary to the illuminating engineer and the wide range of duties they are called upon to perform. He emphasized the important part they are able to play in the national defense program.

At the dinner dance in the evening, which concluded the spring lighting conference, President Cameron briefly outlined the progress of the Society and enumerated the opportunities for service in defense industries.

Ivar H. Stockel, chairman of the Georgia Chapter, presided at the conference sessions.

New Orleans Meeting

An all-day lighting conference was conducted by the New Orleans Chapter on April 15 at the Roosevelt Hotel. President Cameron, Vice President Palmer, and Mr. Hibben, also addressed the New Orleans Chapter.

The application of fluorescent lighting in residences was described by E. W. Commery, director of residential lighting for General Electric, Nela Park, and Frank R. Reindl, of Des Plaines, Ill., employed by the Banjamin Electric Man-

(Continued on page 78)

Among those who addressed the New Orleans Chapter's lighting conference were, left to right, E. W. Commery, director of residential lighting, Nela Park, Frank B. Lee, division engineer, St. Louis, and R. P. Burrows, sales promotion department, all of General Electric Co.; Frank R. Reindl, of Benjamin Electric Mfg. Co., Des Plaines, Ill.; and Ray A. Siedle, manager of lighting division, Grand Rapids Store Equipment Co. I.E.S. President Cameron, Regional Vice President Roy A. Palmer, and Sam Hibben, of Westinghouse, also addressed the group

APPLIANCE Service

Factors that Enter Into Cooling Coil Capacity

By Allen Parker

ALTHOUGH there may be few occasions when the refrigeration service man will find it necessary to calculate the refrigeration capacity of a refrigeration coil, the ability to make such a calculation may prove of inestimable value when such an occasion does arise. An understanding of the various factors that enter into such a calculation will prove helpful to the service man and will contribute a great deal to his judgement of refrigeration problems and practices.

With this thought in mind, let us go further than the manufacturer's tables of ratings and investigate the various factors that enter into the design of an actual installation.

Factors Affecting Capacity

Throughout this discussion, let it be remembered that the outside physical dimensions can be depended upon very little in determining the capacity of a coil. Consideration must be given to such factors as (1) ratio of secondary to primary surface, that is, of fin surface to surface of tube proper; (2) arrangement of secondary or fin surface with respect to tube; (3) arrangement of primary surface, that is, arrangement of tubes in the coil; (4) construction of baffles; and (5) humidity conditions in the refrigerated compartment.

The first factor, ratio of secondary to primary surface refers to fin coils which are used in about 90% of all applications. The primary surface is the surface coming into direct contact with the refrigerant or the refrigerant tubes themselves, while the secondary surface is the fin or the surface attached to the primary surface. The purpose of the fins is to speed up the transfer of heat from air surrounding the coil to the refrigerant carrying tube. Obviously, the complete coil cannot carry away any more heat than the refrigerant carrying tubes can handle. The fins add to the capacity of a coil up to the capacity of the tubes, and the more fins there are to the inch, the greater the capacity of the coil. Coils having fins widely spaced on them are for the purpose of easy defrosting.

As an example, a coil having 100 square feet of fin surface and 10 square feet of tube surface has a ratio of secondary to primary surface of 10 to 1. As the fins are spaced farther apart, the ratio becomes smaller. If two coils have the same overall dimensions and one has a 10 to 1 ratio while the other has a 5 to 1 ratio, the coil with the 5 to 1 ratio will have a greater capacity per square foot of total surface than the coil with the larger ratio, although the total capacity of the 5 to 1 ratio coil will be less than that of the 10 to 1 ratio coil.

The second factor, or fin spacing, must be given consideration because of the direct effect it has on air circulation, especially after a small amount of frost has accumulated. The coils having the fins closely spaced have a tendency to restrict the air, causing the coil to operate at a lower temperature and yet do less work.

The arrangement of the refrigerant tubes is an important factor in the capacity of a coil. For example, greater capacity per square foot of surface is obtained from a coil two tubes high than from a coil four tubes high. This is because the rate of heat transfer to the coil is dependent upon the difference in temperature between the warm air striking the coil and the refrigerant in the coil tubing, and the baffling of all equipment is arranged for natural convection so that the hot air rises to the top of the fixture through the hot air flue and then drops from the top down through the coil.

Naturally the hot air at the widest differential in temperature strikes the coil at the top tubing and is partially cooled and further reduced in temperature as it strikes each successive lower tube. Thus the air passing the bottom tube has the temperature reduced only a fraction of what it was reduced as it passed the top tube. Consequently, the capacity of the last tube was considerably less than that of the top tube, and the overall capacity of the entire coil per square foot is something between that of the top tube and that of the bottom tube.

Calculating "K" Factor

In figuring the capacity of a coil, it is necessary to know the "K" factor of the coil, the definition of which is the amount of heat per hour that will be absorbed by a square foot of surface per degree of difference in temperature between the refrigerant and air. However, the previous discussion on coils has proven that there is a number of variables that enter into the capacity of a coil making it impossible to get an accurate or controlled "K" factor for all makes of coils, so the manufacturer's figures on the "K" factor should be used. Also as we consider a simple example of applying the "K" factor, we will use the box heat leakage available from a standard chart as this article will not include the basic calculation of how that is done.

Let's take a walk-in cooler or butcher box 8 ft. x 10 ft. x 10 ft. in size with 4" cork insulation operating under normal service in room of 90 degrees F. temperature and maintaining a temperature in the cooler of 40 degrees F. The total heat leakage and service taken from a standard chart would amount to about 3,172 btu per hour. If we choose a water-cooled compressor, we find that a 1/2 hp compressor, operating with water at 70 degrees F., and with a 15 degree refrigerant temperature, has a capacity of 3,120 btu per hour for 2/3 operation.

We might mention here that there is no fixed refrigerant temperature at which all 40 degree walk in coolers should be operated, but as a general rule, the refrigerant tem-

(*Continued on page 76*)

Connecting Diagrams for Lap Wound A-c Motors

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

THIS article includes the three phase, twelve pole, three lead, two parallel star, and two parallel delta connecting diagrams. Also, a continuation of the discussion on voltage changes. In this article, consideration will be given to the effect of over voltage on alternating-current lap-wound stator windings.

Figure 57 shows the standard three lead, twelve pole, three phase, two parallel star, connecting diagram. The dotted lines in the small schematic diagram indicate where the equalizer connections can be added. In this diagram, a long jumper is used on each line lead to pick up the start of the second parallel leg as groups 1 and 19, 3 and 21, 35 and 17.

The star connection in Figure 57 has six connections to it, or three connections directly opposite, as group 14-16-18, then groups 32-34-36. If the connection is to be used without equalizer connections, then two short star jumpers can be used; that is, one jumper for group 14-16-18, and another for groups 32-34-36. This method of using two separate star jumpers can be used on large stators where the single jumper would be long and cumbersome.

Figure 58 shows the standard three lead, twelve pole, three phase, two parallel delta connecting diagram. The line leads each have one long jumper to which there are four connections.

Table I—Effect on Motor Performance of Over and Under Voltage

MOTOR CHARACTERISTIC*	OVER VOLTAGE				UNDER VOLTAGE					
	10%		25%		5½%		9%		27%	
	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
Power Factor, full load		1¼		5	⅛		¾		2½	
Efficiency, full load	¾		1			1		2		7
Slip, full load		15		35	12		21		90	
Rpm, full load	1		1¾			¾		1½		3
Starting Torque	21		56			11		19		50
Maximum Torque	21		56			11		19		50
Total Losses		6		10	4½		14		73	
Stator Copper Losses		17		27	11		22		117	
Rotor Copper Losses		17		31	12		22		97	
Iron or Core Losses	18		50			11		15		45
Magnetizing Losses	20		75			8		17		50
Starting Current	10		25			5½		9		20
Full Load Current		7		11	5		11		24	
Temp. Rise, full load		3°-C		7°-C	3°-C		6°-C		18°-C	

*Figures in "Plus" and "Minus" columns indicate per cent increase and decrease in motor operating characteristic at left of table. Table applies to lap-wound a-c motors.

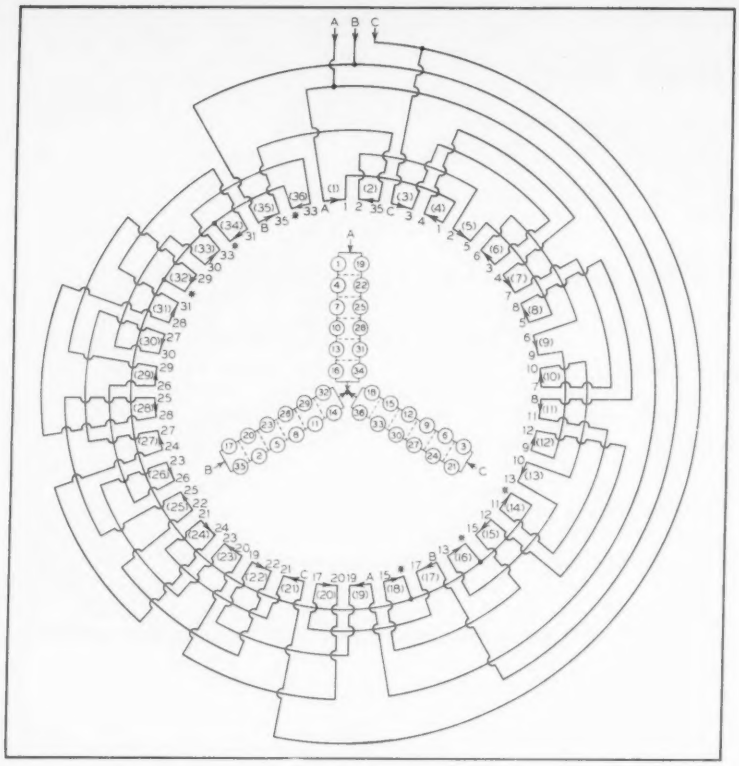


Fig. 57. Two-parallel star connection for 12-pole, three-phase, lap-wound wound induction motor. Dotted lines are equalizer connections.

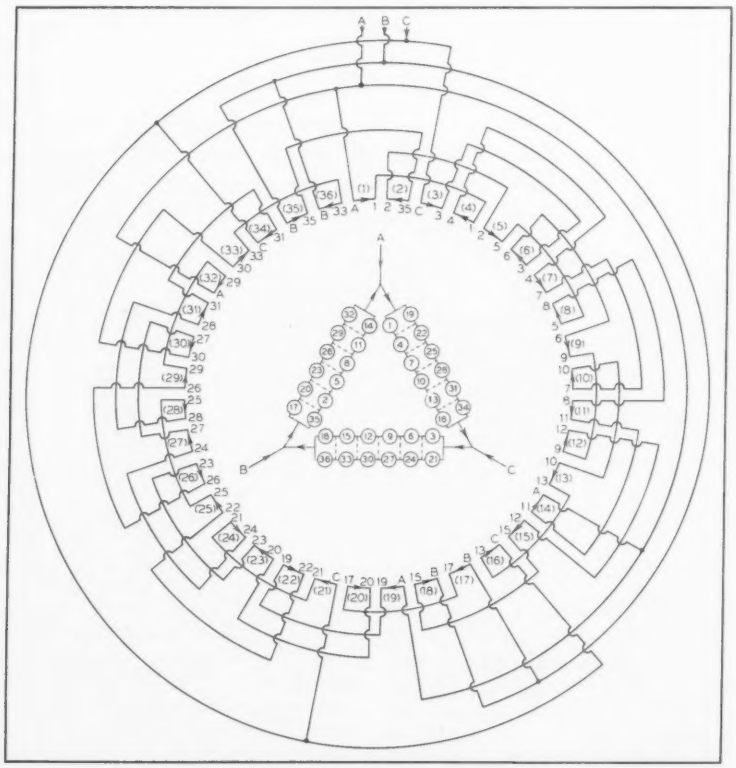


Fig. 58. Two-parallel delta connection for 12-pole, three-phase, lap-wound induction motor. Dotted lines are equalizer connections.

A comparison between Figures 57 and 58 will indicate how a delta connection can be changed to a star, or a star to a delta. For example, to change the star connection, Figure 57, to a delta, as in Figure 58, proceed as follows:

First, remove the star jumper and open all star connections. Then connect the star connections from groups 14 and 32 to the A line lead; connect the star connections from groups 16 and 34 to the C line lead; and connect the star connections from group 18 and 36 to the B line lead. A change from the delta to star is made in just the opposite manner.

Effect of Voltage on Windings

When reconnecting a lap-wound, a-c motor for different voltages, there are cases where the resultant connection does not produce normal voltage conditions in the winding. Let us consider the effect of over voltage and under voltage on the various items of performance.

Table I lists fourteen major characteristics that are affected by over voltage or under voltage. These percentages are general and the exact amounts will vary with the size and design of the motors, but the table indicates the trend of the effect on each item.

Power factor at full load is reduced by over voltage as a result of an increase in magnetizing current, the wattless current being dependent upon the leakage and magnetizing current. The magnetizing current is generally about 1-1/2 to 3 times the leakage current and varies as the square of the applied voltage.

At half load, the decrease in power factor is greater running from 15 to 40 points less at 25 per cent over voltage, or up to 6 points less at 10 per cent over voltage. Thus any increase in applied voltage over 10 per cent tends to reduce the power factor and the decrease is more serious as the motor load is decreased.

Efficiency at full load is slightly improved by over voltage. The change in efficiency is dependent upon whether a decrease in copper losses offsets an increase in core losses. With over voltage, the copper losses are generally less, as the full load current is decreased for the same horsepower output. However, at half load and at 20 per cent or 25 per cent over voltage, the efficiency may decrease anywhere

(*Continued on page 76*)

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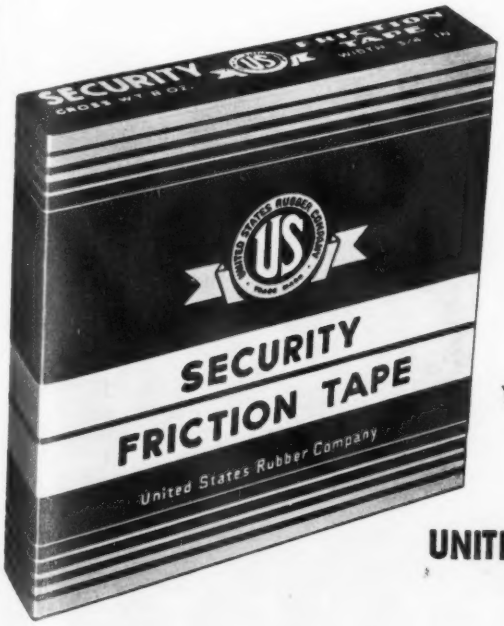

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CAUTION . . . Light is a preventive, not a CURE, for eye trouble. If you have eye trouble, have your eyes examined and cared for.
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12,000,000 meters now in service are old and uncompensated, with load characteristics comparable to those indicated by the drooping curve. Considerable revenue losses often result from metering modern appliance loads with these uncompensated meters.
TAKE 3 STEPS TO SAFEGUARD SIGHT!
TAKE THESE
Have Your Eyes Examined!
Your eyes are the most delicate organs of your body. You can do them irreparable harm by neglecting symptoms of eye trouble. At the first sign that anything is wrong, have your eyes examined! And take the precaution of having an eye examination at least once a year. If glasses are prescribed to remedy a mechanical defect, wear them truthfully! You can't buy new eyes.
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Poor lighting is one of the most common causes of poor vision. Eyestrain is sure to result when you do close-seeing tasks like reading, figuring and sewing in improper light. Eyestrain ruins eyes and health. To be sure of good lighting, use I. E. S. Sight-Saving lamps in your home—
The I.E.S. Sight-Saving Lamp provides glareless direct and indirect light, softly and evenly diffused.
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Dark, dingy walls and ceilings rob you of light—make it hard for your eyes to do their many close-seeing tasks. The remedy is new paint or new paper. The ceiling in any room should be white or near white so as to reflect light. And for side-walls the lighter, softer values are recommended for better seeing conditions. When you light up, paint up.
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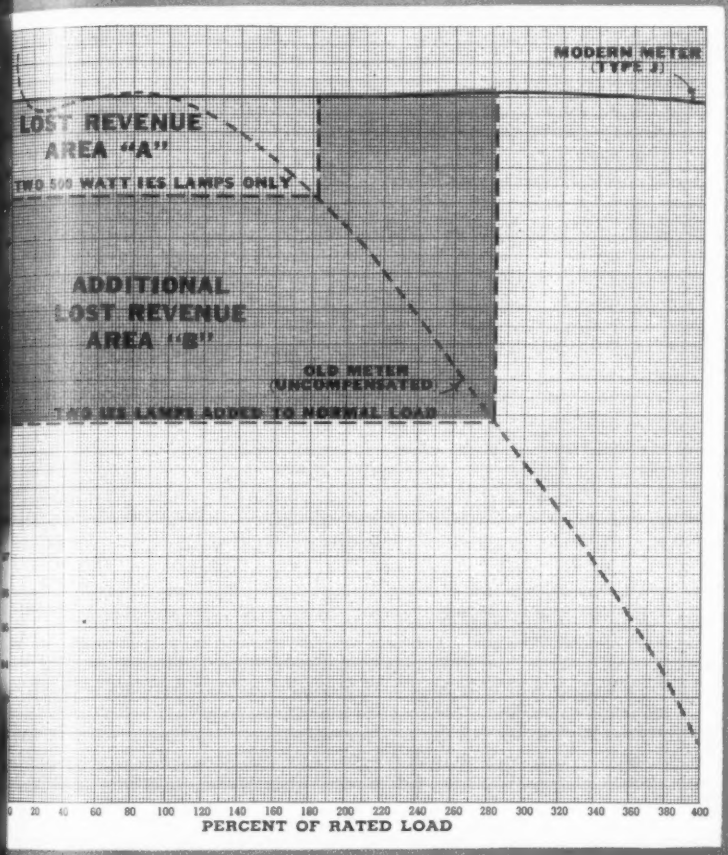
Modern Meters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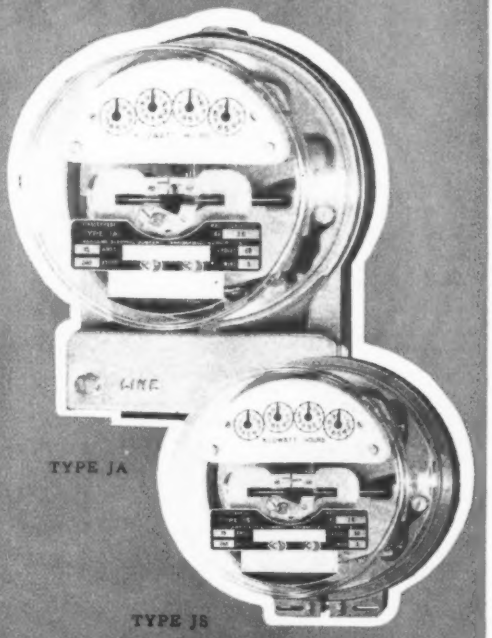
(UNCOMPENSATED)
TWO IES LAMPS ADDED TO NORMAL LOAD
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400
PERCENT OF RATED LOAD



TYPE JA

TYPE JS

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That modern watthour meters play a significant part in obtaining full revenue from these added ds is illustrated by the above curves. When measured by an uncompensated meter, two 500 watt lamps ne can cause a registration loss of 2.8 percent, (see "Lost Revenue Area A"). Added to other normal ds, the loss may be as great as 9 percent, (see "Additional Lost Area B").

An adequate survey of individual operating properties will indicate where a change to modern ers will be a profitable investment through revenue gains.

ICCOMPANY **SPRINGFIELD ILLINOIS**

Florida Contractors Hold Annual Meeting

(*Continued from page 35*)

as I remember," Mr. Knox continued, "pioneered the use of small diameter building wire so that it could be installed into existing raceways, providing for additional circuits, thereby taking care of additional load. By this method of wiring there was hope to break down the dikes and flood the entire electrical industry with rewiring installations.

"We have every reason to believe," he continued, "that this will not come to pass. Rewiring installations do not hinge on rules and regulations, and we cannot change people's habits of doing business or living by simply making rules or laws. They will do business in 1941 just as they did in 1938 and 1939. Neither does the rewiring of stores, office buildings, apartment houses, or residences depend on the size of the wire, or whether the present raceway is of proper size to take care of additional circuits.

"In my opinion," Mr. Knox continued, "it comes under the heading of 'keeping up with the Jones' because 90 percent of the managers and owners remodeling their places of business, do so in order to keep step with their competitor across the street. The competitor across the street rewires and remodels his place of business because his home office in Texas or Chicago was remodeled and rewired, thereby increasing the volume of business to such an extent that a similar wiring plan was carried out in all the branches of that particular business throughout the country.

"I believe," Mr. Knox said, "that if the electrical industry spent one-half as much money advertising the advantages of a properly wired business or residence as the toothpaste companies do over a national hookup the result would be noticed immediately."

Voltage Drop Disregarded

Mr. Knox said the spot for the contractor to place his best efforts was in promoting adequate wiring rather than attempt to sell rewiring jobs. He also critized what he called the attempt of the 1940 code to disregard voltage drop and said the cross section of a No. 14 wire remains the same whether it is type R carrying 15 amperes or type A carrying 32 amperes. "They cannot repeal Ohm's Law," he said, "therefore to increase the amperage of No. 14 wires above 15 amperes becomes ticklish business."

He said he recommended to the Miami electrical industry, where he is chief inspector, that they follow the rules in the 1937 code book instead of the 1940 and when they buck against a rewiring job where the raceways cannot be removed and replaced with larger ones at a reasonable cost, then and then only should they apply the rules applying to 13 other types of wire in the 1940 code.

In the latter part of his address he explained how they had cured a lot of ills in Miami by requiring that a wiring plan be submitted before a building permit is issued. Since the plan has been in operation over 75 per cent of the wiring installations have been contracted for prior to the time the building permit is issued. He said it allowed the contractor to go out and do a real job of selling because a minimum wiring standard has taken the jobs away from the chislers and curbstone mechanics. Since the plan has been in effect, Mr. Knox said, business building contracts had increased 300 per cent and residence contracts had increased 80 per cent.

Don B. Clayton, of Birmingham, member of the executive committee of the National Electrical Contractors Association talked during the afternoon of the first day. He said the defense program was flooding the contractors with work so they must organize and get in position to handle it profitably. He cited restrictions by government regulations, additional taxes, and cautioned the contractors to know all these costs and to figure them in when they make the bid, otherwise the contract may prove unprofitable.

He cautioned contractors to set up a reserve, each in his own way, but to surely have it. He also reviewed the labor problem, reminding them that many in the industry were too old for full service and that on the younger end, the draft was taking out many. He said the industry was faced with educating a new crew to do the work and would then have the problem of losing them to another job if they can get a few cents more an hour.

He told them not to mislead themselves into thinking they operated an independent business, because he said their business was controlled by their competitors and by labor. In boom times, he commented, the average contractor feels he is too busy for his state organization and for the national body, but that is the very time he should have all the information he can possibly get in order to keep abreast of the new developments on all fronts.

Program Featured Lighting

Lighting was a predominant topic. In addition to the excellent lecture of C. R. Long, H. J. Chanon of General Electric gave a talk on "Comparison of Competitive Sources of Fluorescent Lighting," in which he went over the entire high voltage field. Uses of the tube in high voltages by sign companies and others was shown and a lighted panel was used to show colors and voltage effects. He also dwelt briefly on the effects and dangers of shock from 15,000 volt transformers used to operate the lights.

D. B. Clark put on the night show of lighting with his "Cavalcade of Light" which was well attended and well received.

On the second day Harper Davidson, of Florida Power & Light, discussed the subject of "Power Factor and Fluorescent Lighting," in his own original way, which was well received by the entire audience. His delightful talk was about the "little ol' power factor" which was represented on a chart by a young calf. Keynote of his talk was the motto "A Man's Judgement is No Better than His Information." After commenting on previous talks about technical difficulties with fluorscent lighting, he said that the new lighting was here to stay and the contractors might just as well go to work on it. After they have gone into it, he said, and fully understood it, their fears would depart.

Mr. Davidson said with proper selling the customer would not expect more than he was entitled to. He said prepare them for burnouts of tubes, show them the exact cost for tubes on a yearly basis when the contract is obtained.

He said there was no use tiptoeing on the subject of selling lighting by the square foot. Compare the cost of adequate lighting, he said, with the cost of floors, carpets on which the cost is high. They claim eyesight is priceless, he said, yet the average person will spend twice as much for something to walk on.

Loyd E. Jones, of the Food Ma-

(*Concluded on page 80*)

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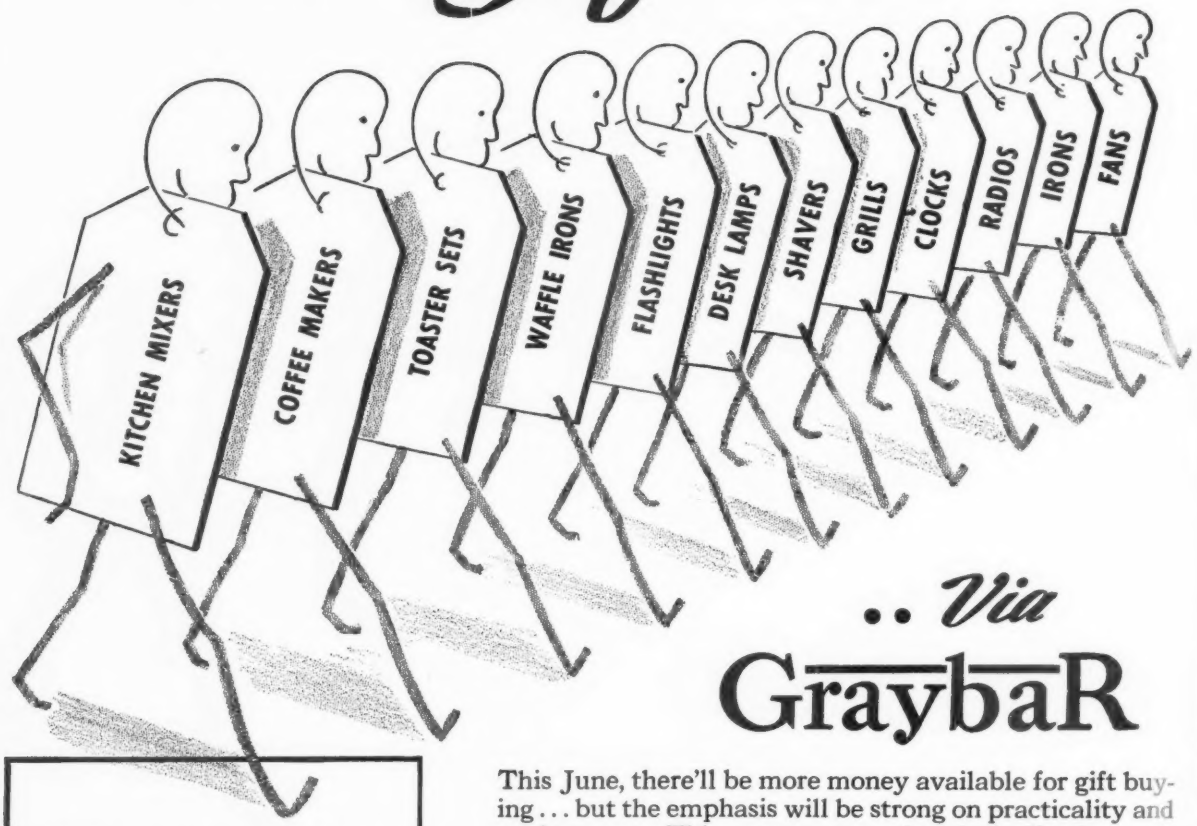

.. *Via* GraybaR

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SMALLER STEPS IN REGULATORS BENEFICIAL ON RURAL LINES

Smaller steps of station type regulators mean increased capacity at the end of the line where it is needed most. The author indicates how a few extra dollars in regulator first cost may save thousands in line construction.

By G. W. Clothier
Transformer Division
Allis-Chalmers Mfg. Co.
Milwaukee, Wis.

ALL TOO often first cost is the dominating item in the evaluation of regulating equipment, with far too little consideration given to such things as depreciation, maintenance, and actual results obtained. This is especially true in the small branch regulator field, probably because the branch type of regulator sells for a relatively low price and is usually installed on small low revenue lines in suburban territories.

Although the branch regulator may be installed on a small feeder in a suburban territory, it undoubtedly will actually receive less maintenance, fewer inspections, and more severe duty for its size than units that are put in attended or semi-attended substations. Most branch regulators are hung on a pole and forgotten until they cease to function. They then are inspected, taken down and repaired. Relatively few operators give a branch regulator a regular inspection or include it in a regular maintenance program, at least a program as systematic as that generally given station type equipment.

Consequently, one of the first requirements of a branch regulator is that it be of rugged design, simple construction, and capable of operating for long periods without trouble from any cause. Generally, the units handle 50 or 100 amperes at about the same number of operations as small station regulators so that there is no reason why the tap changing mechanism, the contacts, and the transformer parts should not be equally, or even more, rugged than station type machines. Then, too, the branch regulator is often installed without by-pass switches. Hence, if a breakdown in the regulator does occur, it will be impossible to take the unit out of service to repair it without interrupting the load or at least going to considerable expense.

Thus, in evaluating the first cost of a branch regulator it is essential to anticipate the amount of maintenance, the chances for interruption of service, and the cost of those interruptions. Ofter the expense of a line crew to remove a regulator from a pole and the shop expense of repair work will more than make up for the difference in cost between a low priced branch unit and a station type regulator.

Importance of Band Width

Another very important factor in evaluating regulator cost that has been given more and more consideration by a number of utilities in recent months is the effective regulating ability of the machine; the regulator's "band width" and the effect of this band width upon the loading capacity of the feeder. By band width is meant the band within which a regulator will hold the voltage, for there is no feeder regulator on the market today that will hold the voltage at an absolutely constant value. All of them, whether induction or step type station units or the step type branch units will hold the voltage within certain limits and no closer than those limits.

In general, the station type feeder regulators will hold voltage within very narrow band widths; and the branch types, such as the two or four step booster, within much wider limits. This is illustrated by Fig 1, which shows a fluctuating incoming voltage and the regulated output voltage of both a 2½% step and a ⅝% step regulator. It is assumed that both types of regulators are capable of holding the voltage within + or — one step, or a 5% band for branch unit and a 1¼% band for the station regulator. It is possible to adjust both regulators to closer limits, but one step has been shown simply to make the two comparable. If narrow bands are chosen, the results will be the same.

Hypothetical Branch Feeder

The general effect of band width can probably be shown by an illustration of a very simple case. This example is not intended to be any particular branch feeder. It merely shows the effect of band width and will aid in applying the concept to actual operating conditions. Most modern utilities have set up certain voltage tolerances for their customers and have designed their systems so that the voltage never becomes higher or lower than those values. Since the actual tolerances vary greatly for different systems in different parts of the country, it is assumed, in this example, that a maximum variation of + or — 5% is allowed. In other words, the voltage shall never become lower than 95% and never higher than 105%

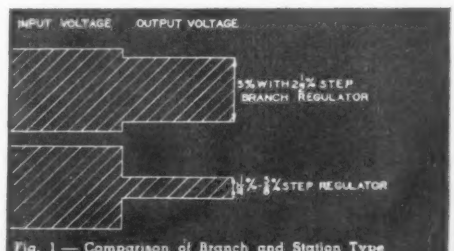

Fig. 1 — Comparison of Branch and Station Type Regulator Operation

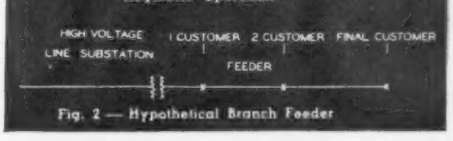

Fig. 2 — Hypothetical Branch Feeder

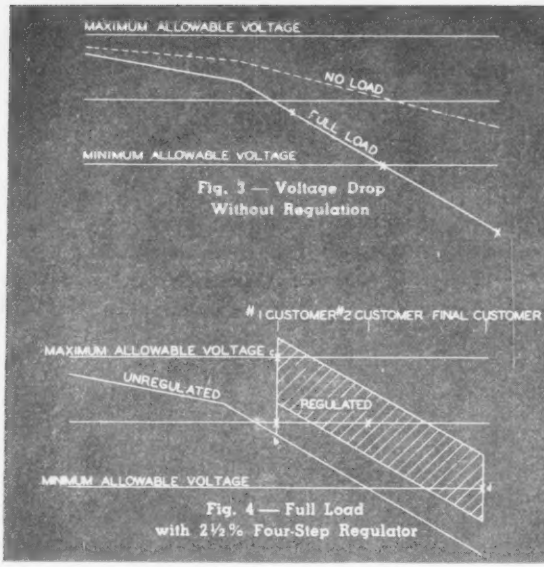

Fig. 3 — Voltage Drop Without Regulation

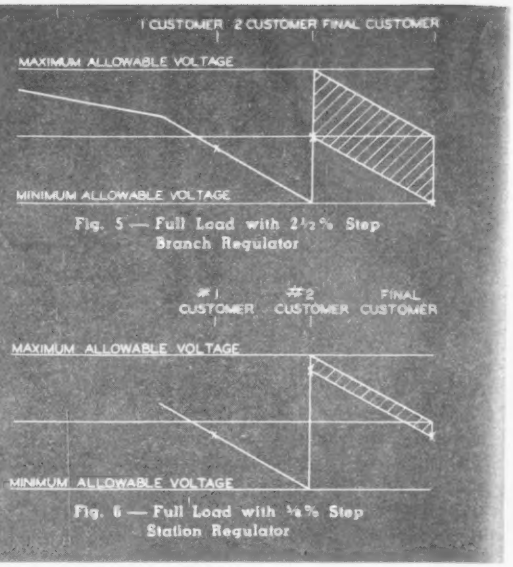

Fig. 5 — Full Load with 2½% Step Branch Regulator

Fig. 4 — Full Load with 2½% Four-Step Regulator

Fig. 6 — Full Load with ⅝% Step Station Regulator

of the rated circuit value. If it does go beyond these limits, either the circuit must be reconstructed or other corrective measures applied.

Figure 2 illustrates a very simple case of a sub-station feeding a single line with a partially distributed load. It shows three customers: one not far from the substation, one half-way between the sub and the end of the line, and another at the end of the line. The voltage for all of these customers must lie within the + or — 5% tolerance, or between the minimum and maximum allowable voltage as shown on Fig. 3. From the voltage distribution as shown in Fig. 3, it can be seen that the first two customers lie within the tolerances, but that the third or last customer has a voltage 5% low. At minimum load the voltage distribution is shown by the dashed line, and all three customers are within the tolerances.

In order to correct the full load voltage condition, one solution might be to install a four-step branch regulator at the first customer's location and set its contact making voltmeter and line drop compensator so that the voltage at customer No. 2 would be held at 100%. Since the regulator does not hold a fixed output voltage but rather a voltage band, the voltage distribution would appear as in Fig. 4, where the regulated portion of the band is 5% wide. With the regulator located and set in this way, it would be impossible to hold the voltage within the prescribed + or — 5% tolerance on all three customers under full load conditions. A solution to this would be to place the regulator at the second customer instead of at the first so that the voltage distribution would appear as in Fig. 5, and all three customers would be within the prescribed tolerances.

However, if the load on the system increased slightly or if the feeder were extended some distance beyond the final customer, the voltage would drop below the prescribed minus 5% tolerance on all customers after the third. If it were attempted to increase this voltage by increasing the amount of raise at the regulator, voltage on the No. 2 and perhaps No. 3 customers would become too high. Therefore, Fig. 5, represents the ultimate installed capacity of the feeder, and no further expansion is possible without imposing abnormal or subnormal voltage on some customers.

Regulator Economy

Instead of installing a four-step branch regulator, a ⅝% step station type regulator could be installed at the second customer, and the voltage distribution would appear as in Fig. 6. With this type of regulator, all three customers are easily within the tolerances; and, in addition, the final customer has a minimum voltage 3¾% above the allowable minimum. In other words, there is 3¾% additional allowable voltage drop that may be capitalized upon by increasing the length of feeder and the load by as much as 25-30%. In any case, the narrowed band width has added capacity to the system and made possible expansion at no increase in cost of voltage regulation.

Although the regulator having the narrower band width might initially cost two or three hundred dollars more than a four-step unit, over a period of time it actually saves three or four times the additional cost by eliminating the necessity for later purchases of line regulating equipment.

This is a simple example of how narrow band widths may increase feeder capacity and effectively lengthen feeder circuits. It is not intended to be an actual case, but the general principal may be applied on any circuit; and in every case the ⅝% step narrow band regulator shows a great advantage over four or eight step branch regulators.

It is for this reason that some utility operators have discontinued the use of four-step and eight-step regulators, feeling that the only type of regulators that can be justified for branch feeder service are the first class, narrow band, station type machines.

●

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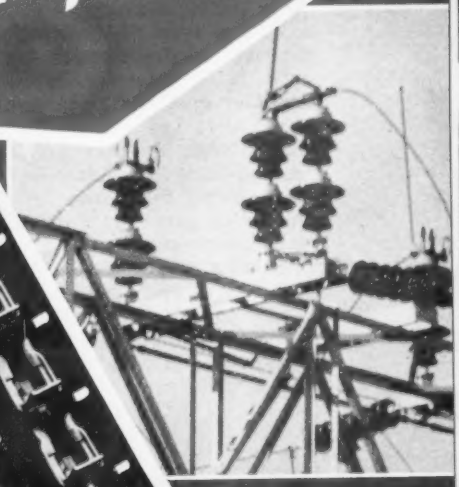

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New Transformer Core Steel Offers Many Advantages

By H. V. Putman
Manager, Transformer Division
Westinghouse Electric & Mfg. Co.
Sharon, Pa.

NEWEST offspring of industrial research is Hipersil, an improved magnetic material which, used in transformer cores, has one-third greater flux-carrying capacity than the best conventional silicon steel. In carrying this increased flux it requires no more magnetizing force and its losses will be no greater. Furthermore, its magnetostriction, or sound-producing property, is reduced so that increased magnetic flux causes no increase in sound level. In its first application it has reduced size and weight of distribution transformers as much as 25 per cent; has facilitated reduction of copper losses some 10 per cent and thereby increased short-time overload capacity.

A crystal of any magnetic steel is cubical in form; is easily magnetized along its edges, less easily along its diagonal. If these molecules could be packed face to face like toy building blocks in a tray, the material would be easily magnetized in any one of six directions. Such a steel would be perfectly "grain orientated." Ordinary silicon steel has little or no grain orientation, but the special process of producing Hipersil results in orientation in one direction (that of rolling); hence the material is easily magnetized in this direction.

Its flux carrying capacity in this direction is almost one-third greater than that of conventional hot-rolled silicon steel, but used at right angles to the grain it would be much less effective than the older material.

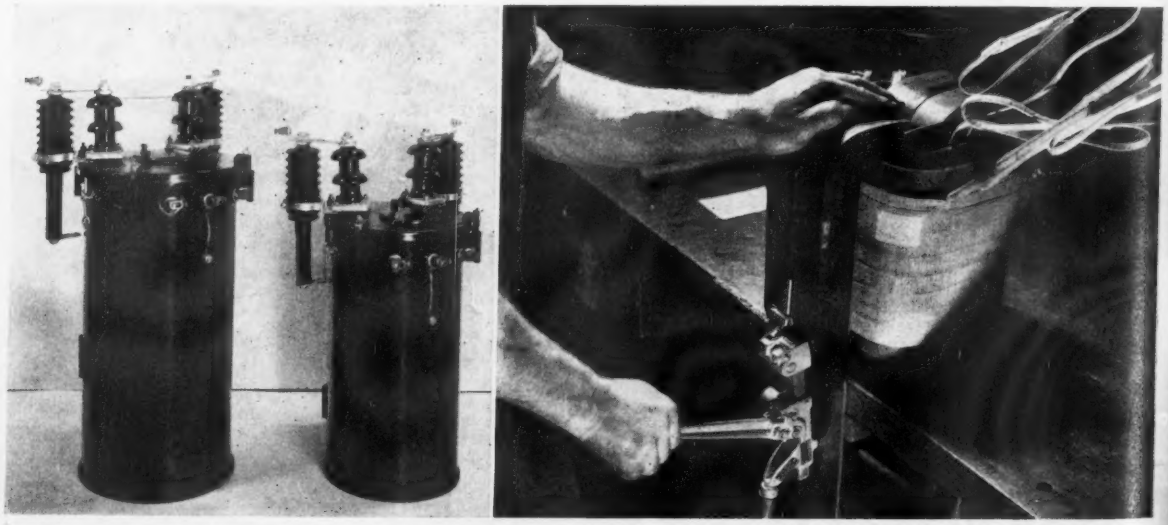
Magnetic Hum Is Less

Under a magnetizing force a piece of steel elongates, then contracts when the flux collapses. Elongation depends on the strength of the magnetic field. With an alternating flux, as in a transformer, this dimensional change takes place twice each cycle; so the core is a structure that changes in size continually. These mechanical vibrations are transmitted through transformer oil to tank wall, then to surrounding air, thereby resulting in transformer hum. Though the movement is extremely small — only about 12/100,000 inch for a core 4 feet long—the resulting noise may be annoying.

Known technically as magnetostriction, this cyclic dimensional change in Hipersil is less than in ordinary silicon steel at the same flex density. Even at the higher densities at which Hipersil is utilized in transformers, magnetostriction is at most no greater, so transformer noise will not be increased as a result of greater flux density in the core. Should it be important to produce a transformer of unusual quietness, a relatively small reduction in flux density in the Hipersil core would produce the desired effect.

Makes Transformers Smaller

Because Hipersil can be worked at higher induction than ordinary silicon steels, the size and weight of transformer cores can be reduced; consequently, fewer turns of copper are needed, and the average length of turn is diminished. This means that less iron, copper, and oil can be used, and that these components can be placed in a



Smaller size, lighter weight and increased short-time overload capacity are among the principal advantages of the new Hipersil distribution transformers. At left, a new 10 kva transformer is compared with a conventional 10 kva unit. One step in construction is shown at right: cores are slipped over coils and banded with steel.

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HANG THE LOAD ON HUBBARD HARDWARE"

New Transformer Core Steel Offers Many Advantages

By H. V. Putman
Manager, Transformer Division
Westinghouse Electric & Mfg. Co.
Sharon, Pa.

NEWEST offspring of industrial research is Hipersil, an improved magnetic material which, used in transformer cores, has one-third greater flux-carrying capacity than the best conventional silicon steel. In carrying this increased flux it requires no more magnetizing force and its losses will be no greater. Furthermore, its magnetostriction, or sound-producing property, is reduced so that increased magnetic flux causes no increase in sound level. In its first application it has reduced size and weight of distribution transformers as much as 25 per cent; has facilitated reduction of copper losses some 10 per cent and thereby increased short-time overload capacity.

A crystal of any magnetic steel is cubical in form; is easily magnetized along its edges, less easily along its diagonal. If these molecules could be packed face to face like toy building blocks in a tray, the material would be easily magnetized in any one of six directions. Such a steel would be perfectly "grain orientated." Ordinary silicon steel has little or no grain orientation, but the special process of producing Hipersil results in orientation in one direction (that of rolling); hence the material is easily magnetized in this direction.

Its flux carrying capacity in this direction is almost one-third greater than that of conventional hot-rolled silicon steel, but used at right angles to the grain it would be much less effective than the older material.

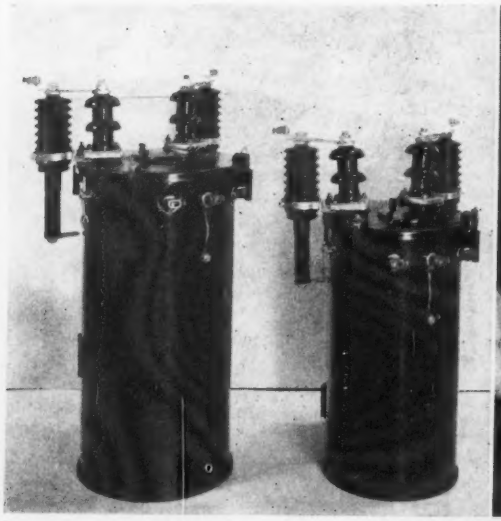
Magnetic Hum Is Less

Under a magnetizing force a piece of steel elongates, then contracts when the flux collapses. Elongation depends on the strength of the magnetic field. With an alternating flux, as in a transformer, this dimensional change takes place twice each cycle; so the core is a structure that changes in size continually. These mechanical vibrations are transmitted through transformer oil to tank wall, then to surrounding air, thereby resulting in transformer hum. Though the movement is extremely small — only about 12/100,000 inch for a core 4 feet long—the resulting noise may be annoying.

Known technically as magnetostriction, this cyclic dimensional change in Hipersil is less than in ordinary silicon steel at the same flex density. Even at the higher densities at which Hipersil is utilized in transformers, magnetostriction is at most no greater, so transformer noise will not be increased as a result of greater flux density in the core. Should it be important to produce a transformer of unusual quietness, a relatively small reduction in flux density in the Hipersil core would produce the desired effect.

Makes Transformers Smaller

Because Hipersil can be worked at higher induction than ordinary silicon steels, the size and weight of transformer cores can be reduced; consequently, fewer turns of copper are needed, and the average length of turn is diminished. This means that less iron, copper, and oil can be used, and that these components can be placed in a



Smaller size, lighter weight and increased short-time overload capacity are among the principal advantages of the new Hipersil distribution transformers. At left, a new 10 kva transformer is compared with a conventional 10 kva unit. One step in construction is shown at right: cores are slipped over coils and banded with steel.

"IT MAKES A DIFFERENCE TO ALL ETERNITY WHETHER WE DO RIGHT OR WRONG TODAY" *James Freeman Clark*

AND THAT IS WHY—

UNIFORM HIGH QUALITY

RAW MATERIALS AND GALVANIZING ARE ASSOCIATED WITH *HUBBARD POLE LINE HARDWARE* AT ALL TIMES . . . WHETHER ORDERS ARE FOR FULL CARLOADS IN LUSH PERIODS, OR FOR ONE PIECE DURING THE SLACK SEASON.

THAT *SPRING CONSTRUCTION* YOU ARE PLANNING WILL SERVE YOUR CUSTOMERS IN THE BEST POSSIBLE MANNER IF IT HAS THE UNIFORM DEPENDABILITY, STRENGTH AND DURABILITY THAT ARE SYNONYMOUS WITH THE NAME HUBBARD.

HUBBARD AND COMPANY

PITTSBURGH . . . OAKLAND . . . CALIFORNIA . . . CHICAGO

HANG THE LOAD ON HUBBARD HARDWARE"

MORE THAN A MILLION HOTPOINT RANGES SOLD

←THE ARISTOCRAT —Replica of Hotpoint's One Millionth Electric Range; De Luxe Features

$179.50* F. O. B. Chicago
Installation Extra

NEW CENTURY, full → capacity Hotpoint Electric Range. All porcelain enamel; 5-Heat Calrod Units; Thrift Cooker.

$99.95* F. O. B. Factory
Installation Extra

*Prices subject to change without notice.

Reprinted from Editorial in "Air Conditioning & Refrigeration News" of March 26, 1941.

A Million Ranges

MONDAY of this week the millionth Hotpoint electric range was produced by the Edison General Electric Appliance Company.

Ordinarily the NEWS doesn't get excited about the "millionth unit" of anything. It is an old publicity gag. But this case has unusual significance.

In addition to the George Hughes angle (he is the man who started the industry and kept it alive through a quarter century of discouragement, slow progress, obstacles, and eventual triumph), it gives definite point to the editorial argument so often presented on this page in the last two years that the electric range is now definitely big-time.

More than any other companion appliance we know of, it offers the refrigerator dealer an opportunity for profitable volume this year.

Hotpoint Writes A "Big Time" Succe Story! *Producing More Than A Million Elec Ranges Marks A Turning Point!*

A MILLION electric range sales are a lot of sales for one manufacturer. This makes the electric range definitely "big time." Hotpoint feels proud to have helped write this big-time success story with its retailers.

Hotpoint always has tried to think *ahead* of the market, to plan for the future. We have thought ahead in product design: over $1,000,000 has been spent in developing the new Improved Hi-Speed Calrod Unit, the fastest durable heating unit known. Hotpoint also pioneered Five Measured Heat Switches, Automatic Oven Temperature Control, Flavor-Seal Oven, 5-Heat Thrift Cooker, and many other features.

We have thought ahead by sup ing "big time" Promotion Plans National Advertising to guide pu opinion towards the electric range so help retailers to sell over a mi Hotpoint Electric Ranges.

As Hotpoint swings into its Sec *Million* Electric Ranges the t realizes that the switch to electric ing marks a profitable future for t appliance retailers selling Hotp Electric Ranges. The Electric R is a fast-selling appliance that make money for you from now Get the whole exciting story from Hotpoint distributor, or Edison eral Electric Appliance Co., Inc., West Taylor Street, Chicago, Ill

Hotpoint

Electric Ranges · Refrigerators · Water Heaters · Clothes Dryers · Washers and Ironers · Automatic Dishwashers · Electrasink · Steel Kitchen Ca

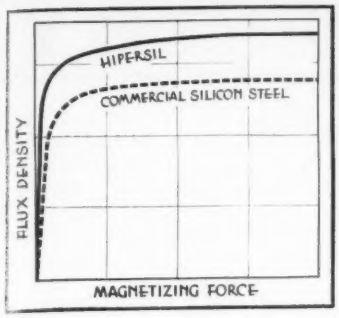


Fig. 1. Hipersil works at higher flux density than ordinary silicon steel because the knee of the saturation curve is about a third higher.

smaller tank. For distribution transformers weight reduction is from 20 to 25 per cent.

About the largest single-phase transformer than can be mounted on a pole is 75 kva. With Hipersil such a unit can be replaced by a 100-kva transformer. Similarly, prevailing practice limits the size of three transformers hung on a single cross-arm to about 37½ kva each, but this limit now can be easily increased to 50 kva.

More KVA Per Dollar Invested

Improvement in voltage regulation gives to the system operator more electrical capacity per dollar of investment. Normally energy must be supplied to the consumer at a specified maximum regulation; therefore, if the transformer can carry a larger load safely to reach a given voltage regulation, it has an increased useful load-carrying capacity.

Greater flux-carrying capacity of the newly evolved material can be used by the designer in two ways to improve the voltage regulation. Shorter average length of turns in the winding, and consequently lower copper resistance, reduces voltage drop at unity power factor, while shorter mean turn and fewer number of turns gives lower reactance, which reduces voltage drop at low power factor. In general, incandescent lamps and heating appliances operate at unity power factor; motor-driven devices and fluorescent lights result in low power factor loads. Since the usual load comprises all types of devices, it is important to reduce not only resistance but also reactance so that regulation may be improved under all conditions.

In transformers rated at 15 kva and less, voltage regulation has been improved, on the average, approximately 10 per cent at unity power factor and 12 per cent at 0.80 power factor. In larger sizes impedances are determined by short circuit considerations rather than by regulation, so in this range emphasis is placed on smaller weights and dimensions.

The simple magnetic circuit of a Hipersil transformer makes ventilation of the winding easy, so the temperature gradient between coils and oil can be reduced. Since copper losses for a given load are decreased, the quantity of heat generated in the winding is lessened, and a greater short-time overload can be carried without exceeding safe operating temperature. A typical distribution transformer using the new magnetic material carries 2¼ times full load for an hour, but an older transformer of the same rating carried only 1.9 times full load for the same period and same temperature rise.

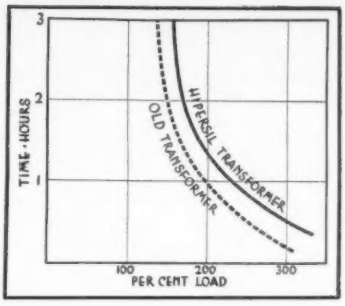


Fig. 4. More short-time overload capacity is an inherent characteristic of the newly developed transformers using Hipersil. These load-time curves for 10-kva units show that the new transformer carries roughly 20 per cent more load for a given time to reach a temperature rise of 55 degrees Centigrade in the winding.

During the last two decades distribution loads and load factors have increased steadily, because of the increasing use of major electrical appliances. In 15-kva and smaller transformers using Hipersil, losses are adapted to these modern loads by lowering copper losses and increasing iron losses, so that their product remains essentially the same as in older transformers. As a result

(Continued on page 80)

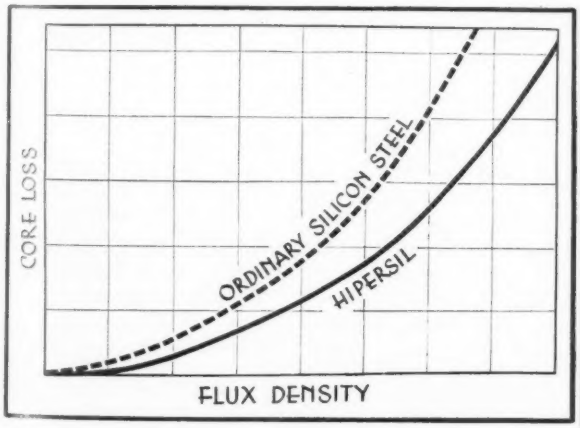


Fig. 2. Hipersil has lower loss than ordinary silicon steel at same flux densities. Losses are about the same when both work at their normal operating densities.

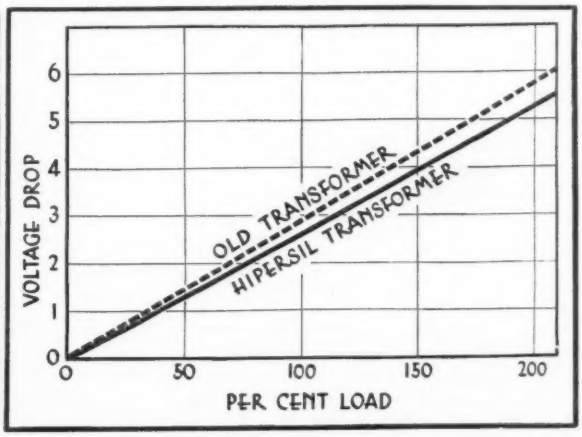


Fig. 3. Voltage regulation is improved by the new material, especially in smaller distribution transformers. These regulation curves are for 2400-volt 10-kva transformers operating at 0.80 power factor. On the average, voltage regulation of transformers rated at 15 kva and less has been improved 12 per cent at this power factor.

NEWS of the INDUSTRY

South Carolina Power Contracts to Distribute Santee-Cooper Power

Under a cooperative agreement signed on April 16th by the South Carolina Public Service Authority and the South Carolina Power Company, the power company will become a contract distributor of Santee-Cooper power.

In addition to agreeing that the utility concern will buy 8 per cent of the authority's power for five years, the Santee authority and the power company contracted to cooperate in order to reduce the cost of electric service, increase the use of electricity, advance industrial and agricultural development and maintain efficient and adequate electric service.

An early effect of the contract will be the bringing of 10,000 kilowatts of firm power three months early to the Pittsburgh Metallurgical Company's steel alloy plant being constructed near Charleston. Power company current will be supplied the mill through Santee-Cooper by August 1, three months earlier than the Santee-Cooper contracted to supply it.

Ernest L. Godshalk, president of the power company, and Robert M. Cooper, general manager of the authority, expressed satisfaction over the conclusion of negotiations. This agreement, made prior to completion of the public development, represents one of the first instances in the nation of such cooperation between a private and public utility. Mr. Godshalk said that it represented "logical development" of the power resources at hand.

Because of this agreement, duplicating power facilities will be avoided. The power company has the transmission and distribution facilities and the Santee-Cooper will have the generating facilities. Now it will not be necessary for either to duplicate the equipment of the other.

Mr. Godshalk had the following comment to make with reference to the agreement:

"The company is happy to be able to work out this agreement with the South Carolina Public Service authority for supplying power needed for defense requirements prior to completion of the Authority's facilities. South Carolina Power Company will continue to act in the interests of the area which it serves, the state and the nation at large.

"Upon completion of the Authority's facilities, additional capacity will be made available in the area served by the company through its purchase of power from the Authority.

"Most important from the standpoint of the customers of South Carolina Power Company is the outlook that the Company may purchase additional power from the Authority and for a longer period of time upon the condition that the Company will agree with the Authority before November 1, 1941, when a schedule of annual reductions in the charges for electric service, subject to the approval of the South Carolina Public Service Commission, to all of the Company's customers in South Carolina. Such reduction would gain for these customers the maximum benefits which can be effected through the distribution of Santee-Cooper power.

"The large block of additional power made available to this area under this contract will be further assurance that the needs of our customers and the unusual requirements of defense will be amply provided for."

Plant Additions Announced By Carolina Power & Light

Another $3,000,000 addition to the Carolina Power and Light Company's Cape Fear steam electric generating plant was authorized in Raleigh by the board of directors in a specially called meeting to map plans for further cooperation in the national defense program, L. V. Sutton, president and general manager, announced recently. The Cape Fear plant is located 27 miles southwest of Raleigh in Chatham County. In addition to the new plant the board also approved plans for the construction of five 110,000 volt transmission lines.

In preparing for what was termed an "all-out" program for defense, the board also approved plans for new substations, improvements to present substations, high speed relays, increased capacities of existing substations, and other improvements.

"Our company desires to cooperate to the fullest extent with the national defense program and we have been—and are—supplying many essential defense industries and Army bases with the electric power they need," Mr. Sutton said.

The new budget increases the budget approved the first of the year and calls for a total expenditure of more than $8,500,000 during this and next year.

Both of the new units at Cape Fear are scheduled to be ready for service next year, one in April and the other in August. Each of the new units will be of 40,000 horsepower capacity, and when both are placed in service capacity of the plant will be increased to 124,000 horsepower.

Second Unit for Mobile Announced by Alabama Power

The Alabama Power Company announced April 1, subject to approval by the State Public Service Commission, that it would install a second 40,000-kilowatt unit of its new Chickasaw steam plant at Mobile. It will be a duplicate of the first unit which will be in commercial operation within 30 days.

The second unit will cost approximately $3,000,000, bringing the investment in the plant to about $7,000,000, announced Thomas W. Martin, president. It will be supplied by Westinghouse Electric & Manufacturing Company and will be ready for operation in January 1943.

Power Generation Cooperative Organized in Mississippi

Organization of the South Mississippi Electric Power Association, the first step in a statewide program for the construction of generating plants to serve state rural electrification association was announced by Evon Ford, chairman of the state rural electrification authority.

Chairman Ford said the generating cooperative, formed at Columbia, will have headquarters at Collins, and following a survey to

A Type S (non-tamperable) fuse that is

practical

for the user

and

profitable

for You!

Retails at 7½¢ in 15 to 30 amp. sizes

PRACTICAL for the user

because it stops needless blowing — and thus wipes out any excuse for tampering. The long time-lag of the fustat prevents it from blowing when motors start on washing machines, refrigerators and other such appliances. Yet it . . .

Protects flexible cords against burnout — in spite of long time-lag

The fustat contains a fuse. The ability of a fuse to protect against dangerous cord shorts or grounded sockets is well known. The fustat . . .

HOLDS like a *large* fuse when safety permits —

OPENS like a *small* fuse when safety demands.

Prevents circuits being robbed of protection

The fustat protects the user against anyone unwittingly creating a fire or injury hazard thru haphazard practices.

Unlike ordinary fuses a fustat cannot be replaced with a penny — or with a size too large to protect. In fact, sidetracking the fustat in any way is practically impossible without destroying the fustat or adapter and thereby showing the user that his protection is gone.

Retails at 7½¢

Fits present fuseholders

Thru the use of an inexpensive adapter, that locks in place, the fustat fits in any standard Edison base fuseholder.

On new jobs you can specify that panels, switches etc. be equipped with fustat bases.

PROFITABLE for you

because it permits adding more appliances to present circuits. The circuit can be loaded right to capacity with perfect safety — and without needless blows even when motors are started. This often saves the expense of a new circuit and helps close a sale.

Stops dangerous overloading of circuits

Since it is practically impossible to replace the fustat with anything but another fustat of the correct size — circuits cannot be loaded beyond safe capacity. If additional circuits are needed the user cannot readily side-step the issue by overloading the circuit at the sacrifice of safety.

Reduces loss of time and money on needless "blown-fuse" service calls

When a fuse blows on a starting current everybody loses. The user's service is off . . the service man may be dragged away from more profitable work . . . the full cost of the call may not be collected if the user kicks about paying it just to have a fuse changed . . . the whole electrical industry loses because needless interruptions of service are costly, annoying and unnecessary. The fustat stops this senseless waste by eliminating such "false-alarm" service calls.

It's just good business to sell, install and use Fustats

The FUSTAT

FOR FULL INFORMATION WRITE TO ANY OF THESE FIRMS

BUSSMANN MFG. CO. University at Jefferson, St. Louis, Mo.

JEFFERSON ELEC. CO. Bellwood, Ill.

KIRKMAN ENG. CORP. 121 Sixth Ave., New York City

NATIONAL ELEC. PDTS. CORP. Fulton Bldg., Pittsburgh, Pa.

UNION INSULATING CO. 27 Park Place New York City

be made by an engineering firm, will file an application with the REA in Washington for a loan of approximately $1,250,000 for construction of the first plant to serve seven rural electrification associations in South Mississippi.

"The new cooperative will deal strictly with the generation and transmission of electric power to the seven associations on an actual basis", Mr. Ford explained. "We feel that with this generating plant the associations will be able to reduce the wholesale cost of their power by about half of what they are now paying for it."

Southern States Lead In Washer Sales Increase

Household washer and ironer shipments again broke all records for the month in February. Washers aggregated 155,546, an advance of 9.29 per cent over 142,318 a year ago and topping the all-time February mark, set in 1937, by 4.02 per cent, according to industry-wide figures reported by Joseph R. Bohnen, executive secretary-treasurer of the American Washer and Ironer Manufacturers' Association.

Ironers shipped in February totalled 11,074 portable models, increase of 304.10 per cent over 2,740 sold in the same month a year ago, and 9,418 table models, compared to 7,443 in February, 1940, a 26.53 per cent advance.

Washer sales in the southern states showed an even greater increase. Approximately 57,000 units were sold in the first two months of 1941 in comparison with only 46,300 during the corresponding period of 1940, an increase of 23 per cent.

Eyes Right! . . . by Squier
MAN'S FIRST LIGHT WAS, OF COURSE, HIS COOKING FIRE. THE IDEA OF A LAMP WAS PROBABLY BORN WHEN A BIT OF FLAMING MOSS OR STICK FELL INTO DRIPPINGS OF FAT. OBSERVING THAT THIS FLAME WAS BRIGHTER AND LONGER LASTING, MEN SOAKED MOSS IN GREASE FOR LIGHTING THEIR CAVES.
OVER-DRAWN AGAIN!
NIX!
COPYRIGHT 1940 BY J.V. CLARKE
TORCHES OF BRONZE DEVELOPED BY THE ATHENIANS WERE OF GREAT ARTISTIC BEAUTY BUT DUBIOUS ILLUMINATING VALUE. THEY WERE CONICAL IN SHAPE, THE HOLLOW CENTER BEING STUFFED WITH OILY RAGS.
IN 1789 THE ENGLISH DISTILLED GAS FROM COAL INTRODUCED IN THE U.S. IN 1816, IT WAS LITTLE USED, DUE TO LACK OF FACILITIES. BY 1875, HOWEVER, IT WAS THE GENERALLY ACCEPTED METHOD OF LIGHTING.
"STICKING TOMMY" WAS THE NAME GIVEN TO THIS CANDLE HOLDER BY GLOUCESTER FISHERMEN
... BUT I CAN'T PRONOUNCE IT!
E SQAP CRPOQ
DEVELOPMENTS RAPIDLY FOLLOWED EDISON'S LAMP OF 1879. THE "STOPPER" LAMP ABOVE LIT THE CHICAGO WORLD'S FAIR OF 1893. DESPITE GREAT IMPROVEMENTS IN LIGHTING, EYE DEFECTS INCREASED DUE TO GLARE, MISPLACED FIXTURES, OVERUSE OF EYES IN POOR LIGHT.
TODAY, HOME AND FACTORY LIGHT CAN BE SCIENTIFICALLY MEASURED TO INSURE PROPER INTENSITY. EYESIGHT SPECIALISTS AGREE THAT ADEQUATE AND PROPERLY DIFFUSED LIGHT CAN GREATLY DIMINISH THE DANGER OF EYE STRAIN, IMPROVE GENERAL HEALTH AND DISPOSITION.

Mats of this series of lighting cartoons are available from the Better Light-Better Sight Bureau, 420 Lexington Ave., New York City.

MKB Water Heater Display Contest Closes in June

A window display contest and a floor display contest for electric water heaters, in which $250 cash prizes will be given in each, will close on June 15, according to notice just received from The Modern Kitchen Bureau.

All utilities and dealers handling electric water heaters are eligible. Prizes in each classification are divided into $100 first prize $50 second prize, and 10 prizes of $10 each.

Rules in each contest are: Displays must be in use for a period between January 1 and June 15, 1941. Each entry must include one glossy print not smaller than 8"x10". Entries must be mailed on or before June 15 to Window Display Contest Committee, The Modern Kitchen Bureau, 420 Lexington Ave., New York.

These contests have attracted a good deal of attention on the part of both utilities and dealers. The Bureau urges that you send in your entry now, and points out that expensive, elaborate displays are not required.

Lighting Campaigns Described in New Manual

Six successful lighting equipment sales campaigns held by utilities in various parts of the United States are described in a 90-page manual compiled by the Home Lighting Equipment Sales Committee of the Edison Electric Institute.

"We have tried to present information of interest to the sales promotion or merchandise manager considering a program for sale of home lighting equipment," says Harry Restofski, Committee Chairman and Sales Promotion Manager, West Penn Power Company. "He will find a wealth of material on employee and dealer campaigns, contests, educational activities and advertising, as used by six utilities, working under varying conditions with budgets of various sizes."

One purpose in presenting book is to stimulate interest and participation in the $1,000 Award Contest announced on December 3, 1940 by the Home Lighting Equipment Sales Committee—descriptive folder of which was sent to chief commercial executives, sales promotion, merchandise and advertising managers of

The world's best cooking is done with

BLACK HEAT

an exclusive feature of The new

CHROMALOX

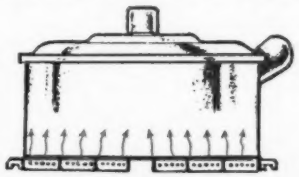
Super-Speed RANGE UNITS

Famous chefs will cook on nothing but a black top—no incandescent heat for them! They demand the delicacy of fine flavor, the juicy tenderness of food cooked with exactly the kind of heat that Chromalox units give. That's why you can offer BETTER COOKING with Chromalox-equipped ranges!

Moreover, this better cooking actually costs less than high-temperature cooking, because Chromalox units cook entirely by CONTACT. They transmit all of their heat to the utensil because they have from 100% to 250% more **contact cooking surface** than any other metal-encased unit.

There's a double-barreled sales advantage to help you sell Chromalox-equipped ranges —**better** cooking plus **cheaper** cooking.

CONTACT COOKING IS BLACK HEAT COOKING

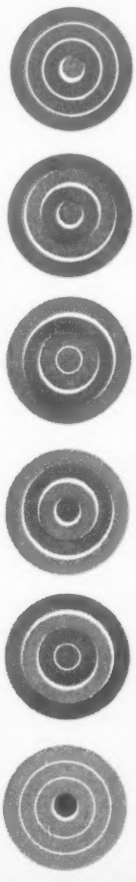


100 to 250% MORE CONTACT COOKING SURFACE

"HOW TO SELL MORE RANGES"

is full of facts that are building new profits for dealers every day. It's free to you—write for it.

...e right heat . . .
... EVERY COOKING NEED



HIGH — *all three rings energized. (Note red color is used to illustrate operation — but Chromalox units do not glow red in service. They are designed to transmit heat by conduction — contact.)*

MEDIUM — *two rings only energized, giving approximately ⅓ of High heat distributed uniformly over the bottom of the utensil.*

CENTER — *middle ring only energized, permitting the use of small utensils with maximum efficiency and economy — the exclusive Chromalox "two-units-in-one" feature.*

LOW — *reduced wattage over two rings only, giving approximately 1/6 of High heat distributed uniformly.*

LOW CENTER — *reduced wattage over center ring only, permitting use of small utensils with approximately 1/15 of High heat.*

SIMMER — *all three rings at low intensity, giving 1/19 of High heat.*

EDWIN L. WIEGAND COMPANY
7600 Thomas Blvd. PITTSBURGH, PA.

Write us or our nearest representative: ATLANTA, GA. — C. B. Rogers, 1000 Peachtree St. • DALLAS, TEXAS — L. R. Ward, 401 Southland Life Bldg. Annex • OKLAHOMA CITY, OKLA. — Paul Berry, Braniff Bldg. • RALEIGH, N. C. — W. R. Phillips

all utilities in the country.

The manual, composed of extracts from the companies' plan books, reveals how each company analyzes the home lighting market in its territory and determines the best method of approach, both in short campaigns and those planned for several years ahead. Dealer and employee cooperative plans, terms, bonuses, etc., and home service advisory activities are described in detail. Advertising and promotional materials are reprinted.

Copies of the manual, which is entitled "Outline of 6 Home Lighting Equipment Sales Programs," may be obtained from the Edison Electric Institute, 420 Lexington Avenue, New York City, at fifty cents a copy.

The increasing importance of adequate wiring to the value of residential property was recognized in a recent conference between representative members of the building and electrical industries. Those who concurred on mutual interest in the A.W. Standards are, left to right: Allan Taylor, Eastern Editor of the National Real Estate Journal, circulated to members of the National Association of Real Estate Boards and others; S. J. O'Brien, Electrical Contractor; William Hamby, well known architect and consultant to McCall's Magazine; Thomas S. Holden, president of the F. W. Dodge Corporation; Lawrence W. Davis of N.E.C.A. and John F. Biggi, the Adequate Wiring Bureau's Consulting Engineer.

Attic Ventilation Drive In Houston Begins in May

Recognizing that opportunities for attic ventilation sales are brighter than ever before, the Houston Lighting and Power Co. has just announced a hard-hitting promotional and sales campaign to be conducted during May, June and July. This campaign will include the following:

888 column inches of newspaper advertising.

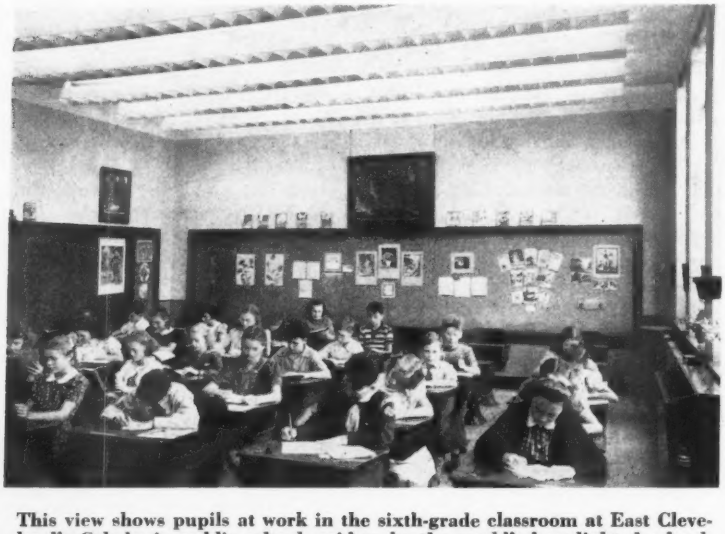
6 radio announcements daily.

10,000 specially prepared folders mailed to selected customers.

133,000 bill inserts mailed to residential customers.

Plus personal sales calls by people especially trained to discuss the value of attic ventilation.

Houston and other cities throughout this territory are attic ventilation conscious, reports H. E. Darrill, sales promotion manager of Houston Lighting and Power Co., proof of which is found in the fact that since early in 1935, when electric attic ventilation was first introduced in this area, 9611 residential and 1380 commercial jobs have been sold and installed.



This view shows pupils at work in the sixth-grade classroom at East Cleveland's Caledonia public school, said to be the world's best lighted schoolroom. Note the man-made sky of fluorescent lamps in their specially designed reflector system. On the bright day this picture was taken, measurements of the illumination prevailing showed that 80 per cent of the light in the room came from the unique overhead system. Lamp wattage is 2500; light intensity with artificial light only amounts to 50 foot-candles.

New Dates for Kentucky Chapter, I.A.E.I. Meeting

Meeting dates for the next meeting of the Kentucky Chapter, International Association of Electrical Inspectors, have been changed, according to announcement by Victor Knadler, secretary. The revised dates for the meeting are Thursday and Friday, June 19 and 20, at the McCurdy Hotel, Evansville, Indiana.

Motor Rewinders Organize New Orleans Chapter N.I.S.A.

Henry Muller, of the Maritime Electric Company, Inc., was named president of the recently organized New Orleans chapter of the National Industrial Service Association. The National Industrial Service Association is an organization of electrical and mechanical service and motor rewinding companies. Other officers of the New Orleans chapter include as vice-president, S. J. Stewart, and secretary-treasurer, L. Bonnecaze, Jr., of Best Electric Company.

Other companies represented in the new chapter are Commercial Armature Works, Industrial Electric, Inc., New Orleans Armature Works, New Orleans Electric Engineering, Nola Electric, Inc.

Premier's
ATHO-MATIC Nozzle
the Perfect Answer

. . . TO A DEALER'S PRAYER!

Three cheers and hooray! At last, a vital new advancement in acuum cleaning that's more than a talking point—it's an *tive selling point!* Premier's Matho-Matic Nozzle can be emonstrated easily, dramatically! And the prospect can see e difference in actual operation! The one and only mathe-atically exact, automatic, self-adjusting nozzle gives that ll-important extra sales punch that moves high-quality clean-rs at high profits—*right on the sales floor!*

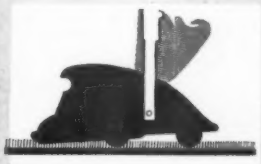
A Line-Up You Can Sell Up!

Three easy steps to bigger profits—three smartly styled models martly priced $15 apart) that cover the market! First step is Model 2 with the Simplo-Matic Nozzle—a thrifty buy alone or in the Matched Set. Next—Model 21 with the Duo-Matic Nozzle! nd the top of the line is the De Luxe Model 11 with the Matho-Matic Nozzle! At Premier's low dealer prices, high ade-in allowances are possible—high profits are certain!

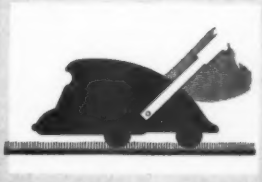
. . . TO A HOUSEWIFE'S PRAYER!

Happy days! It's taken the guesswork out of housework. This Matho-Matic Nozzle is *always* adjusted with mathematical precision to the actual floor surface that's being cleaned—thick rug, thin rug, linoleum, or bare floor. What a work-saver, time-saver—rug-saver, too! And it's just one new feature of the smartly styled Premier De Luxe Model 11, with its black crinkle and polished aluminum finish—its 2-speed, 350-watt, ball-bearing motor—its famous motor-driven Vibra-sweep brush!

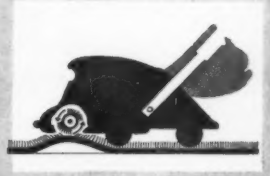
HERE'S HOW IT WORKS!



● As the cleaner rests on the rug with its handle in an upright position the nozzle pushes down gently but firmly into the nap of the rug.



● As the handle is pulled back to normal cleaning position, the nozzle automatically rises to exactly the right height for most efficient cleaning.



● With the cleaner in operation, a perfect suction-seal is effected. The rug is vibrated and gently but thoroughly cleaned on a cushion of air.

PREMIER

ier Division, Electric Vacuum Cleaner Co., Inc.

PREMIER DIVISION, ELECTRIC VACUUM CLEANER CO., INC.
1734 IVANHOE ROAD • CLEVELAND, OHIO

Rush full information on the sensational new MATHO-MATIC Nozzle and the complete 1941 Premier line.

NAME _____

Wood Elected President Of Virginia Public Service

At the annual stockholders' meeting of the Virginia Public Service Company, held at Charlottesville, Virginia, William Elliot Wood, former resident and business executive of Virginia, was elected president of the company. At the same time a Board of Directors was selected.

Mr. Wood is a native of Aiken, South Carolina, and a graduate of Georgia Tech, Atlanta, Georgia. After graduation from college, Mr. Wood began his distinguished career at Jacksonville, Florida, and later at El Paso, Texas, where he was made superintendent of El Paso Electric Company in 1916. In 1918 he was made manager of the Houston Electric Company of Texas and in 1925 he came to Virginia as vice-president of the Virginia Electric and Power Company, Richmond. In 1927, he became president of the company and served in this capacity until 1929, when he became connected with the Stone and Webster Service Corporation, New York City, which position he resigned to accept the presidency of the Virginia utility.

W. E. Wood

Mr. Wood assumes his new duties immediately and replaces M. J. O'Connell, who had announced his resignation last January.

Georgia Power Sales Staff Changes Made

Edward C. Hammond, who has been associated with the sales department of Georgia Power Company since 1933, has been named sales supervisor in the Athens Division, according to recent announcement by vice-president L. M. Shadgett. As sales supervisor, Mr. Hammond will be in charge of all sales and load-building activities in the division, including merchandising, lighting, power, rural lines and home service work.

Mr. Hammond first joined the company upon graduation from Georgia Tech in 1924. He held various assignments in the purchasing, accounting and operating departments before becoming associated with the sales department. Since 1936, he has supervised the Company load-building program in wholesale towns and the merchandising of small appliances.

Howard J. Wilson, who has been conducting a sales training program for Georgia Power salesmen, will take over the small appliance promotional work formerly handled by Mr. Hammond. H. A. Smeeton, direcotor of dealer coordination since the Company's program was launched in 1934, will take over supervision of wholesale town load-building in addition to his dealer work. He is also in charge of the new Company-wide adequate-wiring program and has taken over the training of dealer salesmen.

Photoelectric control applications open a large market for the aggressive electrical contractor. This Westinghouse Phototroller has just caused a bell to ring indicating a waiting customer. Naturally attendants are often too busy to instantly observe all of their prospective customers.

Death Claims Veteran Chief Engineer

Andrew Patterson, chief engineer of the Southeastern Gas and Electric company since 1925, died at his home in Texarkana on April 4. He had been a resident of Texarkana for the last 28 years. He joined the Dawes Electric Company, as superintendent, on his arrival in Texarkana, serving in this capacity until that company was taken over in 1925 by the newly organized Southwestern company. Mr. Patterson was then made chief engineer of the entire Southwestern Gas and Electric company, a position held until his death.

A native of Baltimore, Md., Mr. Patterson was educated in Baltimore public school and received his college work at the Baltimore Polytechnic Institute. He was a member of the American Institute of Electrical Engineers and was a Mason and a Knight Templar.

Southern Distributors Named by Universal

Landers, Frary & Clark, manufacturers of Universal electric appliances announce appointment of the following new southern distributors:

Major Appliances, Inc., Miami, Florida with branch offices in Tampa, Orlando, and Jacksonville as distributors of Universal ranges, water heaters, and vacuum cleaners.

Schoellkopf Company, Dallas, Texas, as distributors of Universal home laundry equipment.

555 Inc., Little Rock, Arkansas, as distributors of Universal home laundry equipment.

Graybar Electric Company Inc., Richmond and Roanoke, Virginia and Durham and Asheville, North

Carolina as distributors of Universal ranges, water heaters, and home laundry equipment.

Inspection Personnel Changed in Richmond

Marshall G. Folks was named chief electrical inspector for the city of Richmond, Virginia, in a recent reorganization of the Bureau of Electrical Inspection, Department of Public Utilities. A. M. Miller, was named assistant chief electrical inspector at the same time.

T. W. Bowry, former head of the electrical inspection department for many years, under whose supervision it has been brought to its present high state of efficiency, now becomes deputy inspector in charge of materials and appliance inspection.

The department personnel also includes P. A. Belton, Jr., deputy inspector.

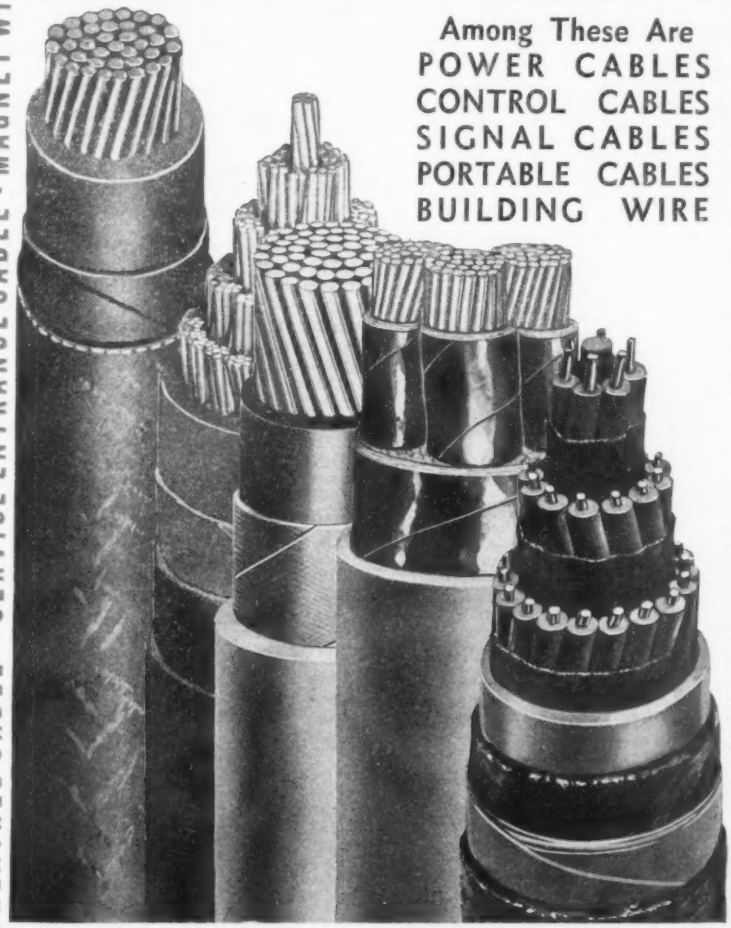
Honor Roll of Southern Section

The following members of the Southern Section, International Association of Electrical Inspectors, have enrolled one or more new members for the association since the current membership campaign was initiated at the close of the annual meeting, September 14. Numbers at right indicate number of new members enrolled by each individual since the membership campaign began last September.

Name:	No. Enrolled:
Bagwell, H. O.—Carrollton, Ga.	1
Bommer, A. J., Dallas, Texas	7
Camus, Frank—Shreveport, La.	8
Campbell, R. D.—Asheville, N. C.	1
Dougherty, C. H.—Franklin, Va.	1
Eberling, J. H.—Houston, Tex.	1
Edwards, Virge—Lyon, Miss.	16
Fisher, J. G.—Jackson, Miss.	3
Fletcher, G. R.—Alexandria, Va.	2
Goodson, Fred—Houston, Texas	3
Hancock, A. E.—Austin, Texas	4
Hendricks, R. B.—San Antonio	7
Jones, C. T.—Atlanta, Ga.	1
Keeley, K. K.—Shreveport, La.	2
Kenderdine, E. L.—Ft. Worth, Tex.	1
Kersey, T. M.—Dallas, Texas	1
King, A. T.—Marietta, Ga.	1
Knox, E. C.—Miami, Fla.	2
LaTour, John—Daytona Beach, Fla.	1
Lyncker, F. O.—New Orleans, La.	1
McKinney, E. W.—New Orleans	2
Mathieu, L. D.—Corpus Christi	1
Miller, G. M.—Richmond, Va.	1
Muller, Paul—New Orleans, La.	1
Muths, S. L.—Gulfport, Miss.	1
Peters, K. O.—St. Petersburg, Fla.	2
Sagendorf, F. P.—Fairfax, Va.	1
Segall, B. Z.—New Orleans, La.	7
Sprouse, J. B.—Clarksdale, Miss.	7
Stewart, W. B.—San Antonio, Tex.	1
Turnage, L. A.—Hartsville, S. C.	1
Verrett, J. A.—Port Arthur, Tex.	2
Weber, Chas.—Beaumont, Tex.	1
Welman, George—New Orleans	3
Whitnee, Jos.—Atlanta, Ga.	3
Yancey, W. H.—Charlotte, N. C.	1
Yelverton, T.—Sylvarena, Miss.	1
Zimmer, Chas.—Houston, Tex.	3
Applications Not Endorsed	2
Total	105

RUBBER COVERED POWER CABLES · BUILDING WIRE

CRESCENT CABLES SUPPLY POWER for DEFENSE



Among These Are
POWER CABLES
CONTROL CABLES
SIGNAL CABLES
PORTABLE CABLES
BUILDING WIRE

CRESFLEX NON-METALLIC SHEATHED CABLE · SERVICE ENTRANCE CABLE · MAGNET WIRE · BARE WIRE

ARMORED CABLE · FLEXIBLE CORDS · LEAD-ENCASED AND PARKWAY CABLES · VARNISHED CAMBRIC

CRESCENT INSULATED WIRE & CABLE CO.

Ask Your Wholesaler For

CRESCENT WIRE and CABLE

Factory: TRENTON, N. J.—*Stocks in Principal Cities*

SOUTHERN REPRESENTATIVES

ATLANTA, GA. Edgar E. Dawes A-4 Rhodes Bldg. Annex

NEW ORLEANS, LA. Paul Hogan, Jr. 823 Perdido St.

DALLAS, TEXAS Huie-Simmer Co. 103 Thomas Bldg.

CRESCENT ENDURITE SUPER-AGING INSULATION

MANUFACTURERS' News

Certification Plan for Residential Fixtures

Following nearly a year of study, the first group of residential lighting fixtures produced under the Specification-Certification Program of the American Lighting Equipment Association has been received and examination by the Electrical Testing Laboratories, of New York, will begin immediately.

Incorporating the Illuminating Engineering Society's "Recommended Practice for the Illumination Performance of Residential Ceiling Luminaires", the A.L.E.A. Specification-Certification Program marks the first effort of the residential lighting fixture industry to produce certified fixtures complying with authorities illumination specifications, identified as such to the public by means of a certification tag.

Conforming to current concepts of interior design practice, the fixtures made in accordance with the ALEA specifications reflect distinct improvements in appearance as well as performance. As a result, they are expected to effect a noteworthy contribution to residential lighting service.

The certification tags, testifying that the new fixtures meet the lighting specifications as well as the A.-L.E.A.'s conception of proper design and quality, will be affixed to each certified luminaire (lighting fixture) offered for sale to the public by the Association's members and their sales outlets.

Sale of the certified fixtures to the public was scheduled to commence on or about March 15, according to Association officials. It is pointed out that this figure explaining that the certified fixtures are designed primarily for main rooms such as living, dining and bedrooms, where illumination performance is a major factor. Elsewhere, in secondary locations such as hallways, vestibules, dining alcoves, etc., where the chief requisite is decorative appearance rather than lighting performance, the present specifications are inapplicable. Fixtures made for such locations, therefore, are not at present subject to the certification program. Later, following further study the specifications may be extended to cover fixtures for secondary locations .

Shortage of Cable Reels Hinders Defense Program

The wire and cable manufacturers are faced with an acute shortage of shipping reels, spools and cases primarily through the failure of busy industries to return empty containers. This shortage is threatening deliveries on vital defense orders. Wire and cable manufacturers are buying and making containers as fast as possible but new containers are not available in adequate volume for the urgent requirements of defense. More containers are needed quickly—all empty reels, spools and cases scattered throughout the nation must be returned and put to work at once.

Utility companies are one of the largest users of cable and can contribute greatly to the defense effort by getting empty containers back on the job. Prompt cooperation with the wire and cable manufacturers will achieve a double-barrelled objective:

(1) Wire and cable shipments to national defense projects will be expedited.

(2) Time, materials and labor required to build new containers will be conserved for other defense purposes.

"Get It Done in 41" is Slogan in YPS Campaign

Youngstown Pressed Steel Division of Mullins Manufacturing Corporation, Warren, Ohio, manufacturers of kitchen sinks and cabinets, has just presented it's dealers with a portfolio cleverly entitled "Get It Done in 41". The portifolio contains the merchandising set-up for the current year, including advertisements which will appear in Better Homes and Gardens, The American Home, Good Housekeeping, and the Ladies Home Journal, trade paper advertisements in American Builder, Architectual Forum, Electrical Dealer, Electrical Merchandising, Electrical South, Hardware Age, Building Reporter, Building Contractors Forum, South West Building Contract.

Dealer helps include "Kitchen Merchandiser", a dealer publication, catalog and folders, newspaper mats and the novel YPS Min-A-Kitchen.

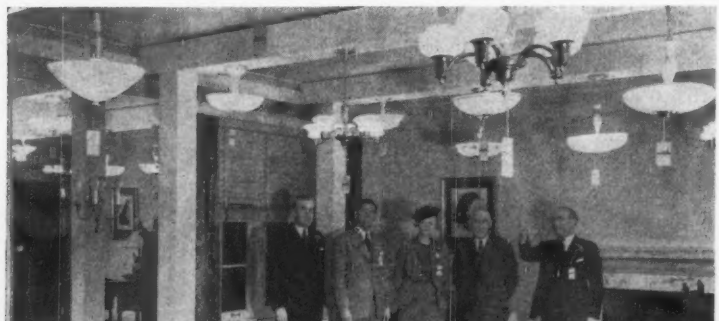
Sound slide films will be used for kitchen planning and demonstration work in kitchen merchandising.

For almost a year the YPS has conducted a factory training school, which has proven very successful in showing YPS dealers how the cabinets are made, tested, and inspected. A large part of the time this school is devoted to actual kitchen planning and round table conferences directed by A. D. Corey.

Bendix Sales to Dealers Up 101%

Shipments of Bendix Automatic Home Laundrys from distributors to dealers for the first 3 months of 1941 compared to the same period for 1940 showed an increase of 101% according to word received from J. S. Sayre, vice president in charge of sales, Bendix Home Appliances, Inc., South Bend, Indiana.

"Public acceptance for 'automatic washing' has shown marked advances when one examines the figures," Mr. Sayre said. "Bendix sales during 1940 more than doubled 1939 . . . now January, February, March sales double the same 1940 period. This is largely due to improvement of product, currently new designs plus the largest national advertising the washer industry has seen."



Exhibited for the first time at the Annual Sales Conference of the Edison Electric Institute held at the Edgewater Beach Hotel, Chicago, March 31 to April 3, the new ALEA certified residential lighting fixtures drew high commendation from the conferees for their illumination performance and attractive design. Photo shows members of the Home Lighting Equipment Sales Committee of the E.E.I. inspecting the certified fixtures at the American Lighting Equipment Association's exhibit.

G-E to Award Ranges in Roast-of-the-Month Contest

The graphic arts, the science of electric cookery, and a generous selection of prizes which includes free ranges and a complete electric kitchen have combined to produce the General Electric "Roast of the Month" Club, a national advertising and merchandising program on a grand scale that has just been launched by the appliance and merchandise department of the General Electric Company, Bridgeport, Conn. Full information has already been placed in the hands of distributors and dealers and the opening gun fired in the form of full-page advertising in national magazines.

"The program is designed to build store traffic and an active prospect list for dealers," J. R. Poteat, G-E range manager declares, "and despite the gilt-edged production we have given it, it rests its case on the tried and tested merchandising ideas that have proved successful—national consumer advertising, valuable free awards, local advertising and promotions, display materials, and store demonstrations."

Ten 1941 model "Stratoliner" G-E ranges are to be given away, one each month, and a grand prize of a complete electric kitchen will be awarded. The consumer contest will be decided on the basis of the best recipes submitted for oven-cooked meat dishes, the judges to be the chefs of nationally-known hotels. Any one not an employee of General Electric and its advertising agency may submit a recipe, or as many as desired. All entries must be made on official blanks obtainable from dealers. The grand prize award of an all-electric kitchen, made to one of the ten range winners, will include a G-E refrigerator, electric sink with dishwasher and waste unit, and steel kitchen cabinets. Every one making an entry becomes automatically a member of the "Roast of the Month" Club, receiving an appropriate certificate, a full-color food picture for framing, and a monthly recipe folder.

The entire promotion, with full instructions and samples of all advertising and promotional pieces, has been included in an elaborately-printed book for distribution to wholesale and retail range outlets participating.

Autovent Fan and Blower Co. Celebrates 25th Anniversary

This year marks a quarter of a century of ventilating progress for the Autovent Fan and Blower Company of Chicago, Illinois. The company was organized early in 1916, and has continually improved and expanded its line.

Under the conservative guidance of Joseph E. Truitt, president, and Emil Ackerman, secretary, Autovent has prided itself in an ability to maintain the highest quality of materials and workmanship regardless of changing market conditions. Today, every piece of equipment carries certified ratings in accordance with their several recognized association memberships. This assures users of guaranteed performance.

The company is a member of the National Association of Fan Manufacturers. They are also members of the Propellor Fan Manufacturers Association and the Industrial Unit Heater Association.

E. J. McFadden, General Electric advertising supervisor, and E. C. Dvorak, sales manager, with one of the window streamers announcing G-E's "Roast of the Month Club."

Universal Holds Key City Distributor Meetings

Executives from Landers, Frary & Clark, manufacturers of Universal home equipment, are now previewing appliance lines for 1941 at a series of dealer conventions on major appliance lines in key cities.

H. M. Parsons, Universal range and water heater sales manager, is currently presenting the line of nine new "Precision Cooking" models of Universal electric ranges in detail. With the exception of two models of Universal electric ranges which are still equipped with 5 heat switches and combination and apartment-house models, all the new ranges are equipped with the many features which go to make up "Precision Cooking." These features include the Mult-I-Heat Control, Magic Eye Oven Control, Select-A-Trol, Superheat Units, Bake Fast Oven and Serv-A-Drawer. The new water heaters in the modern square design include the new Hi-Boy and Table-Top models with features such as heavy gauge steel cabinets, super heat immersion type units, 300-pound test pressure tanks, and Wilcolator thermostats.

W. L. Farquharson is featuring a brand new line of "Wash-White" washers and ironers calling special attention to the new nine-pound tub and such sales features as the Automatic Time Switch, Safety Switch and Automatic Rollstop.

Four people who don't believe that too many cooks spoil the broth are Kelvinator's general sales manager, Frank R. Pierce, and three members of his sales staff. They are shown here discussing the proper way to bake biscuits. The occasion was a special cooking session held for district managers in the Kelvin Kitchen recently. Grouped around the Kelvinator electric range are Don Rulo, sales manager, Laundry Equipment Division; Harold Tasker, district manager; Mr. Pierce, and Ad Barnes, district manager.

News About People

Max W. Babb, president of Allis-Chalmers Manufacturing Company, in March announced the appointment of **Lee H. Hill,** widely known transformer engineer, as assistant manager of the company's electrical department. Mr. Hill has been head of the company's transformer department since 1936, and will now assume, among other duties, general supervision of the electrical department's sales promotional activities, with particular reference to developing public utility business.

L. H. Hill

Mr. Hill served two years as an instructor in electrical engineering at Cornell University immediately following his graduation from that institution; he then became associated with the Westinghouse Electric and Manufacturing Company as transformer design engineer and as engineer-in-charge of power transformer development. For a number of years he was manager of the transformer division of the American Brown Boveri Company, and joined the Allis-Chalmers Company in 1931 when it absorbed Brown Boveri.

At the same time, it was announced that **Carlton B. Smith,** formerly district service engineer of Allis-Chalmers Mfg. Co., in the Southeast District, had been promoted to district superintendent of service and erection with headquarters in the Healey Building, at Atlanta, Georgia.

* * *

As a part of the Crosley Corporation's new program of increased service todealers and distributors, appointment of **C. William Rados,** previously of Detroit, as sales promotion manager of the refrigeration division of the Crosley Corporation is announced by **L. Martin Krautter,** manager of advertising and sales promotion for the Corporation.

Mr. Rados was formerly a business editor and writer and joined the staff of Tradeways, Inc., in 1929 to become a teacher of salesmen. In 1932, he took over the direction of sales training for the Koppers Coke Company of Kearny, N. J., and in 1935, he became a member of the sales training division of the American Radiator Company.

In 1938, he was appointed manager of the National Salesman's Institute, established by the Kelvinator division of Nash-Kelvinator Corporation. He is secretary-treasurer of the National Society of Sales Training Executives.

* * *

Appointment of **G. A. Barker** as manager of Johns-Manville's public utility and electrical products department was announced recently by **L. R. Hoff,** president of Johns-Manville Sales Corporation. Mr. Barker, who has specialized in the development and sale of electrical commodities, was formerly staff manager of the electrical department for Johns-Manville.

G. A. Barker

An honor graduate of the University of California, College of Mechanics, Mr. Barker joined Johns-Manville in 1921 as Pacific division manager of the power products department at San Francisco. Prior to that he was associated with the Pacific Gas & Electric Company in San Francisco, chief engineer for the Central Teresa Sugar Company, Cuba, and chief mechanical engineer of the Industrial Accident Commission of California.

* * *

Thomas J. Roberts will head a new industrial department office established by Johns-Manville to facilitate service to the South's rapidly growing industry, according to an announcement by **Lewis H. Brown,** J-M president, in March. The new district, with headquarters at Atlanta, Georgia, will serve the states of Georgia, Tennessee, North Carolina, South Carolina, Florida, Alabama, and Mississippi.

Thomas J. Roberts

Mr. Roberts was formerly assistant to **T. K. Mial,** J-M vice-president in charge of sales to industry and product development for general industrial use, with headquarters at New York. A graduate of Cornell University, Mr. Roberts has been with the power products and industrial department since 1925.

In making the announcement, Mr. Brown stated that because of the growing markets, great natural resources, and other advantages which the South possesses, the Southern states seem destined for greater industrial expansion in the next 25 years than any other section of the country.

* * *

Elliott Harrington has been named sales manager of the General Electric air conditioning and commercial refrigeration department, with headquarters at Bloomfield, N. J., according to an announcement just made by **John P. Rainbault,** manager.

Mr. Harrington has been connected with General Electric air conditioning and automatic heating activities from their inception, and his early assignments on the development of an automatic oil furnace led directly to the formation of the department, in which he has served in various engineering and sales capacities. Under the new arrangement he will supervise distribution and policy matters, and under him will operate three separate sales sections.

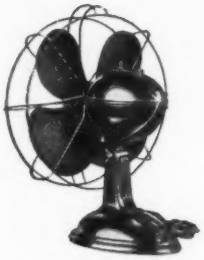
Elliott Harrington

The automatic heating sales section, under **L. H. Hobson,** will be responsible for the sale of all oil and gas heating equipment.

The cooling equipment sales section, headed by **C. M. Rowland,** will supervise the sale of water coolers, room coolers, store coolers, refrigerators of the commercial type, air circulators, and ventilators.

The contractor and industrial sales section, under **S. Martin, Jr.,** will have the responsibility for the sale of all condensing units, evaporators, evaporative condensers, coils, and central plant equipment.

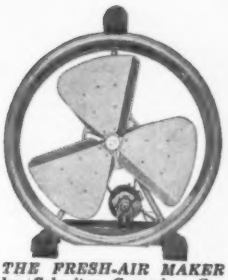
AIR CIRCULATING and cooling EQUIPMENT



R. & M. BANNER Fans, by Robbins & Myers, Inc., Springfield, Ohio.

Advertisers In This Section:

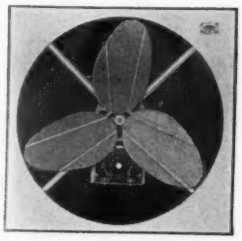
American Blower Corp.
American Coolair Corp.
Autovent Fan & Blower Co.
Buffalo Forge Co.
Hunter Fan & Ventilating Co., Inc.
Robbins & Myers, Inc.
Schwitzer-Cummins Co.
Signal Electric Mfg. Co.
Sturtevant Co., B. F.



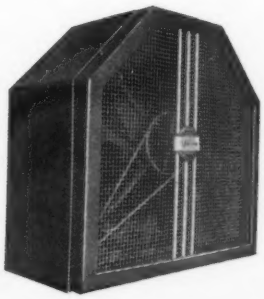
THE FRESH-AIR MAKER by Schwitzer-Cummins Co., Indianapolis, Ind.

BUFFALO Breez-Air Cooling Fans, by Buffalo Forge Company, Buffalo, N. Y.

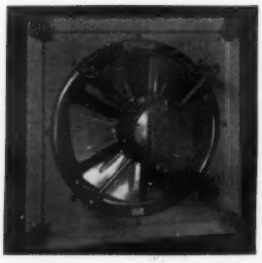
SIGNAL'S Deluxe Streamliner. Signal Electric Mfg. Co., Menominee, Mich.



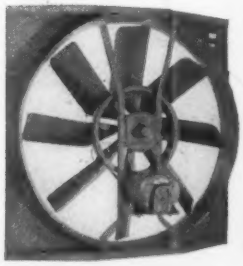
AUTOVENT'S COOLVENT Attic Fan by Autovent Fan & Blower Co., Chicago, Ill.



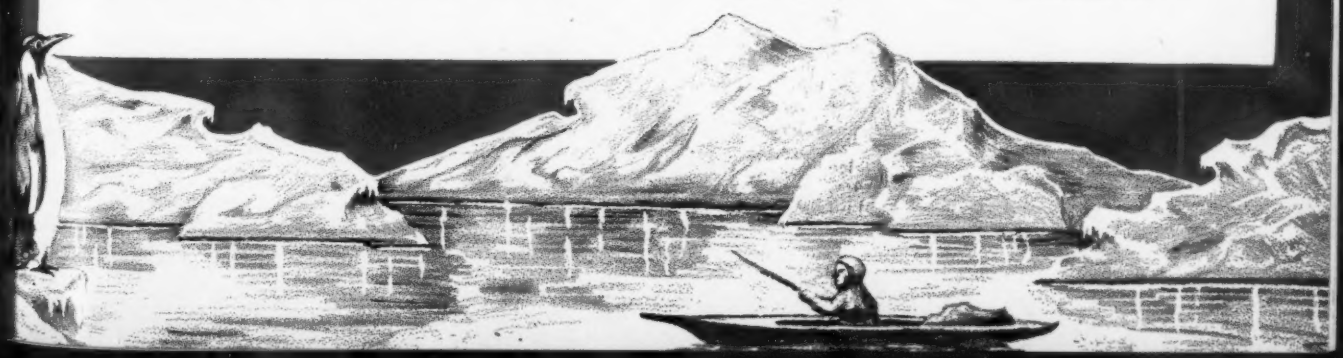
VENTURA Home Conditioner by American Blower Corp., Detroit, Michigan.



STURTEVANT Ventilators, by B. F. Sturtevant Co., Boston, Massachusetts.



COOLAIR Attic Fan by American Coolair Corp., Jacksonville, Fla.



New Products

New Commercial Fans

A 16-inch oscillating desk-bracket model electric fan with Micarta blades is the leading model of the 1941 commercial fan line introduced by the Westinghouse Electric & Manufacturing Company. The 16-inch Power-Aire model will carry a suggested retail price of $37.50. Mounted on a pedestal, this model will sell at $45.00.

The entire line has new streamlined styling, the Power Aire models of the line coming in gunmetal gray, and the Pacemaker models, priced lower, in mahogany brown. Other models in the commercial fan line, in addition to the 16-inch Power-Aire, include a 10-inch Power-Aire oscillating desk fan, priced at $14.-95; a 16-inch Pacemaker model, $29.-95; a 12-inch Power-Aire priced at $29.95 in desk model and $35.00 on a pedestal.

The line also includes a full variety of models of ventilating fans, Whirl-Aire air circulators, and ceiling fans.

Commercial fan salesmen are being supplied a fan survey and application form, which carries complete informatoin as to fan models best suited for particular use. For detailed information write to Westinghouse Elec. & Mfg. Co., Merchandising Division, Mansfield, Ohio.

Portable Air Conditioners

Four new models featuring extensive mechanical improvmeents comprise the new Philco line of portable Air Conditioning units introduced to distributors at five sectional meetings throughout the United States. Most important of the several improvements is the enlarged capacity of several models, making it possible to serve considerably larger rooms than comparable units did heretofore. Also worthy of mention are the distinctively styled cabinets housing the various units included in the line.

Philco's line comprises three window units and one floor cabinet model. Model 40 is a ½ horse power job, designed for servicing small rooms and offered at a price which makes it the advertising leader. The attractive walnut wood cabinet houses a unit which has up to 3,675 BTU cooling capacity, recommended for rooms of approximately 11 by 14 feet, with ceiling of normal height—about nine feet. In common with other Philco air conditioning units, it not only cools, but dehumidifies and changes room air. It is easily and quickly installed in any window and requires no plumbing or watering.

A model of greater capacity is the 61 A, capable of serving rooms or offices approximately 15 by 19 feet, and offering a cooling capacity up to 5,750 BTU. Its adjustable air intake control permits regulation of air flow according to weather conditions. In common with other units in the Philco line, it filters out dust, dirt and pollen, removes stale or smoky inside air, circulates fresh air, shuts out street noises, and keeps room furnishings clean longer. This unit has a ½ horse power rating.

Victor "After-Sale" Tags

To overcome the inevitable 'after sale reaction' when the buyer wonders if he has made a mistake or a good buy, Victor Electric Products, Inc., now have 'after sale' tags for their complete line of Miracle Breeze fans. An attractive gold foil tag, bearing a short sales story, is fastened to every fan leaving the Victor plant at Cincinnati.

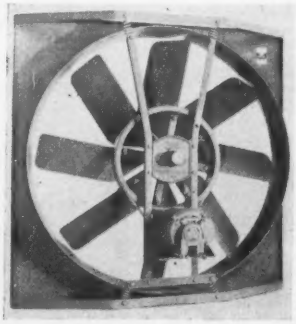
The 'after sale' tag lists the outstanding features of Victor fan construction and design, and is intended to reassure the buyer and inspire him with confidence in Victor products.

The outside of the tag, in addition to indentifying the fan to which it is attached—such as, Vagabond, Viceroy, Vortex, Vanguard—also informs the buyer that the fan he has just purchased is a "genuine Miracle Breeze manufactured by Victor Electric Products, Inc., Cincinnati, Ohio." A five year guarantee, applying to the Vortex and Viking, is also carried on the inside of the tag.

Coolair Attic Fans

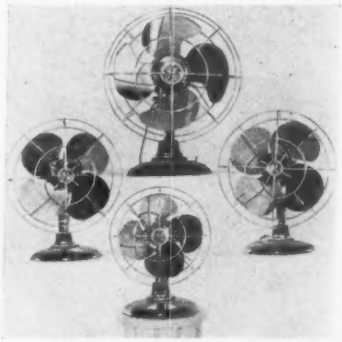
A new and improved attic fan is announced by the American Coolair Corp., Jacksonville, Fla. Designated as the Type O Home-Cooling Fan, it offers many improved features.

All moving parts are cradled in patented sound-absorbing springs, eliminating vibration noise; sturdy, compact welded steel frame, relatively light in weight; eight steel blades of new, more efficient design, individually mounted and easily replaced in event of damage; deep streamlined inlet, reducing air noise and increasing fan efficiency; oversize, highest quality ball bearing in fan hub for silent, lifelong service, requiring greasing only once every three years; reversible—when equipped with reversible motor, fan will blow in or exhaust at will; ball bearings in fan hub permit operation in any position when equipped with ball bearing motor; small, long hour service motor operates at average cost of less than 1c per hour; made in seven different sizes with various motor sizes for each, with capacities ranging from 6,200 to 30,000 cfm.; certified air deliveries, rated by ASHVE Test Code; also available as a Twin Unit with two fans in one frame operated by one motor, and in Attic Package including suction box and metal automatic ceiling shutter.



G-E Low-Cost Fans

The General Electric fan section in Bridgeport, Conn., announces a new standard line of electric fans for 1941, offering for the first time a "family of fans" in the low-cost bracket and embodying the latest features in styling.



The new standard line includes 8, 10, and 12-inch fans with newly designed wide blades which provide forceful delivery quietly. An addition to the standard models is one at the lowest price ever offered by General Electric for a 16-inch oscillating fan.

The smart modern styling of the smaller standard fans features molded plastic bases and a curved motor support plated in chrome. The streamlined fan guards have a highly polished finish, and the newly designed wide blades are smooth black. The decorative monogram is red and aluminum.

The 8, 10, and 12-inch standard fans follow the styling of a 10-inch fan introduced in 1940. The immediate popularity of this fan resulted in the "family of fans" in the 1941 standard line. The 8-inch fan is non-oscillating. The 10-inch fan is available either as an oscillating or non-oscillating model. The 12-inch standard fan oscillates and has two running speeds. The 16-inch standard fan oscillates and has

American Blower
DEALERS
are walking on air!

It's Comfort Cooling—and Electric Ventilation time . . . Business is booming with American Blower Dealers not only because they sell the most complete line in the industry, but also because American Blower products are recognized everywhere for their quality, dependability and extra value. (They can be sold on F. H. A. Pay-by-the-Month Plan through The Heating and Plumbing Finance Corp.)

Then, too, American Blower's colorful, effective, direct mail, magazine and newspaper advertising campaigns and dealers' sales helps are already at work, creating sales, bringing prospects in to authorized American Blower Dealers. If you are

AMERICAN BLOWER COMFORT COOLING
Authorized Dealer

active, energetic and want to make real money selling Comfort Cooling and Electric Ventilating Equipment, investigate the American Blower franchise TODAY. Get in this permanent, profitable business NOW. Mail the coupon, ask your jobber, or phone the nearest American Blower Branch Office today.

Mail coupon NOW

Please send a copy of your new 1941 Sales and Advertising Plans to:

Name _____

Firm Name _____

Street _____

City & State _____

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, 6000 Russell Street, Detroit, Mich.
Division of American Radiator and Standard Sanitary Corporation
In Canada: CANADIAN SIROCCO COMPANY, LTD., Windsor, Ontario

three running speeds.

Prices range from $4.95 for the 8-inch, to $29.95 for the 16-inch fan, which has at high speed an air delivery volume of 1500 cubic feet per minute at a velocity of 1525 feet per minute.

Emerson Air Circulator

The Emerson Electric Manufacturing Company, St. Louis, offers a new Air Circulator Catalog—a colorful 8-page catalog illustrating and completely describing the new line of ultra-quiet Emerson-Electric air circulators.

Two sizes of fans, each available with ceiling, wall-bracket, counter-column and adjustable floor column mountings, make up a truly complete line. New protective spiral guards are also featured.

Along with description, performance information and detailed specifications, helpful information is given on how and where to install Emerson-Electric air circulators for greatest efficiency. Pictured are uses of air circulators extending from the small business to the proper ventilation of large industrial buildings.

Fan Time Controller

A new Time Controller for automatically controlling the operating period of attic fans, store lighting, refrigeration systems, etc., has just been made available by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.

The simple timing mechanism may be set to close a circuit for any period of time from ½ to 11 hours by twisting the knob on the front of the instrument until the desired "time period" appears in the window. When this time period has elapsed, the switch will automatically open and break the circuit to the electrical load.

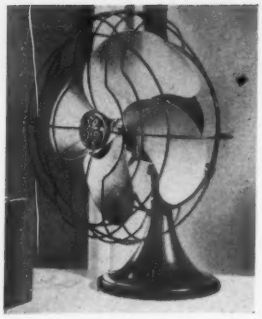
To open the circuit at any time, if this should become necessary, it is only necessary to turn the knob in the opposite direction, back to zero.

The Time Controller is equipped with a snap action single pole double throw switch so that it may also be used to interrupt an electrical circuit and then after a definite period of time reclose the circuit. This makes it ideally suited for temporarily shutting down refrigeration systems to allow defrosting of the coils.

G-E Vortalex Fan Blades

The quite operation and efficiency of the Vortalex fan blade comes in for renewed emphasis reflecting popular acceptance in the 1941 line of General Electric fans. The Vortalex blade, subject of years of engineering development by the G-E fan section at Bridgeport, Conn., is available in a wide variety of "Super-Quiet" models, while the "Quiet" G-E fan, with overlapping blades, is featured in three different sizes of desk-type fans.

Quietness and efficiency in air

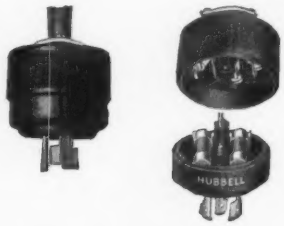


movement go hand in hand with the Vortalex blade. The scientific pitch and shape of the blade puts every bit of blade surface to work with maximum efficiency. The result is a Super-quiet fan which even in the smallest size has an air delivery which exceeds that of conventional fans with larger blades. Economy of operation is another by-product of efficient air movement.

The desk-type fans equipped with Vortalex blades include small, medium, large, and master models. The small and medium models have three blades, while the others have four. These are supplemented by "Super-Quiet" pedestal fans in large and master models.

Twist-Lock Fuse Cap

Harvey Hubbell, Inc., Bridgeport, Conn., has just issued a new catalog page to the trade describing the new 3-wire Fusible Cap of the Twist-lock type for industrial use. Rated 0-15 amperes, 250 volts, the Fusible Cap provides fuse protection to the individual electrical tool or machine which may be fused to its exact ca-



pacity and not depend on the line fuse. Also protects small motor from overload. The use of these caps prevents inconvenience and loss of time due to shut down of entire line when a short occurs.

Body is made of special impact resisting bakelite and exposed metal parts are cadmium plated to resist corrosion.

New Kelvinator Models

Announcement of the addition of two new equipped Kelvinator electric refrigerator models—the C-6 priced at $124.95 and the DA-6 priced at $134.95—has just been made by Kelvinator Division of Nash-Kelvinator Corporation.

Kelvinator's new model C-6, which sells for only $5 more than the $119.75 SS-6, offers an easy step-up from this low-priced leader model. In addition to all the basic features found in the SS-6, the C-6 gives buyers such extra, obvious features as the new Kelvinator stainless steel door-opening trim and a porcelain-covered sliding crisper. It has a 6¾-cubic-foot capacity; a shelf area of 11.8 square feet and a freezing capacity of 84 cubes.

The new DA-6, which sells for $134.95, or just $10 more than the C-6, has everything found in the C-6, plus a large sliding Cold Chest; a glass-covered Crisper and de-luxe chrome trimming on the freezer door and the base. It has 6¾ cubic feet of food storage capacity; a shelf area of 11.8 square feet and a freezing capacity of 64 cubes.

Two similar models have been added to the Leonard line.

Cory Bride Promotion

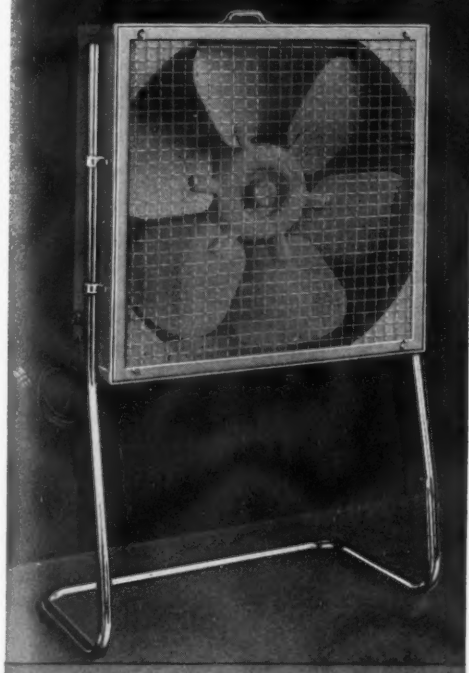
Geared to tie in with June as "No. 1 Brides' Month", the Cory Coffee Brewer folks are offering a new "Quick Moving Assortment"—the "Bride Special". The tie-in with brides includes: (1) Invitation cards

to mail out to preffered prospects interested in wedding gifts. (2) Free Cory Bakelite measuring cups of the new walnut-tone for "give away." (3) Window streamers. (4) Counter Cards. (5) Mats for newspaper ads—featuring Cory as an ideal gift. (6) Complete suggestions for compiling mailing list and following through with an effective promotion. The asortment also provides an extra value in free replacement glass. Special circular describing this timely deal obtained by addressing Glass Coffee Brewer Corporation, Chicago.

Johnson Bronze Catalog

A complete new catalog, No. 410, has just been released by Johnson Bronze Co., New Castle, Pa. Listing stock sizes of bronze bearings, the new catalog indicates many new and important changes made this year. New sizes of plain bearings . . . new types of electric motor bearings . . . have been added, together with other pertinent data. Every item listed in this new book is available, immediately from stock.

New— R&M Portable HOME COOLER



To Cool the Whole House!

Adjust the legs to the proper height, move in front of the window—and blow the hot air out! For inexpensive modern home cooling—the coming type. 24-inch model, 2 speeds, 3850 cubic feet of air per minute, retails for $59.50.

Here's a REAL PROFIT-OPPORTUNITY FOR FAN DEALERS

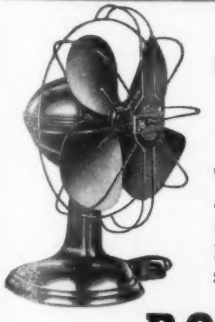
Modern home cooling *with modern fans*, easy to install, economical and efficient in operation, is bringing a *new day of profit-opportunity* to dealers who are watching the signs of the times.

And the R & M Portable Home Cooler, built by America's foremost specialists in *quality* fan engineering, is *the* cooler that will enable *you* to cash in on this opportunity.

Here is a cooler for small homes, apartments, and offices that does the work of an expensive attic-fan installation in larger homes. A cooler that does not have to be built in; that can be demonstrated on your floor or in the home on overnight trial. Just plug it in.

The beauty, simplicity (no troublesome belts or pulleys), silence, portability, and tremendous *comfort-appeal* of the R & M Portable Home Cooler make profitable *large-unit* sales easy.

Investigate this opportunity! Get in on the ground floor of genuine fan-cooling for homes. R & M is a *year ahead* with the fans that meet the need. Send for the new R & M fan catalog. It describes R & M quality fans for every purpose.



R & M BANNER FANS BEAT PRICE COMPETITION!

The finest fans in the moderate-price field are the beautiful new R & M Banner Fans. 10-in. oscillating, only $9.95 retail.

1941 R & M FAN CATALOG

Every dealer should have this presentation of the *complete* R & M line. Shows every type of fan, to satisfy every customer. Write for your free copy.

ROBBINS & MYERS · Inc.

SPRINGFIELD, OHIO • FOUNDED 1878

[Prices and specifications subject to change without notice]

Post-War Conditions

(*Continued from page 31*)

tured as the country's number one social problem.

It is a tribute to the courage and ability of the men and women who carry on this business that in spite of all the obstacles thrown in their way, the electric light and power industry, of all the nation's industries, was probably the best prepared when the national emergency became acute and its government called on it for all-out help. It was ready with the facilities and with the money and with the trained personnel, most of which, from the President to the "grunt," had gotten its experience the hard way. Thanks to the integration program made possible by the common ownership of once isolated properties by the holding companies, it was ready with more than 80,000 miles of high tension transmission lines of 60,000 volts and over that made central station electric power available at every cross roads community throughout the country. This great transmission grid allowed the government tremendous latitude in locating camps, air bases, ship-yards and defense industries. In particular it makes feasible the plans now getting under way for subcontracting defense production and for farming out war orders among widely scattered small plants.

By any fair standard this industry has thus far met the test imposed on it by the mush-rooming defense program. But Mr. W. S. Knudsen now tells the country that we must further increase industrial production by some 60%, including requirements under the lease-lend bill. This is a tall order in any man's language and particularly is that true in the case of an industry for which it is practically impossible to secure new capital. However, this has always been a forward looking business and such mistakes as it has made can be traced to a considerable extent to that fact. In spite of the increase in defense demands, superimposed, for the most part on normal peace-time loads, the country still has a substantial margin of generating capacity, thanks again in large measure to the nation-wide transmission grid which makes it possible to utilize load diversities between companies and systems.

There are some cases where interconnections will prove desirable both in the ordinary course of operation and for meeting defense needs promptly and adequately. The Federal Power Commission is, as you know, recommending additional interconnections in the case of something like half of the geographical divisions into which it divides the country for the purpose of its defense power studies.

In some cases these interconnections will require cooperation on the part of diverse ownerships. However, the fundamental problem is to make the best possible use of existing physical facilities, corporate, governmental and private and the situation calls for the broadest possible application of the executive and technical brains of the industry in cooperation with all affected interests. This is no time to be building Chinese Walls and setting up little localized empires each of which hopes it will be sufficient unto itself. That ought not to be and certainly won't be permitted when all the chips are down.

Where additional interconnections can be justified as necessary to the best interests of the nation, they ought to be and no doubt will be made voluntarily by the interests involved because, after all, the first order of business is to meet the national defense power needs on a broad-guaged, business like basis. Every effort to work out these needed interconnections on sound economic and technical lines is entitled to the fullest cooperation from every quarter and without any exceptions. It would be most unfortunate if the providing of urgently needed facilities were hampered or prevented entirely because of technicalities, including uncertanties incident to the forced sale of properties and the breaking up of systems.

Notwithstanding its present margin of generating capacity the industry still is looking ahead. It is carrying out the greatest expansion program in its history with some 4,500,000 kilowatts of new generating facilities scheduled for operation in 1941 and 1942 and more than half a million kilowatts already planned for 1943. These additions are over and above substantial amounts of capacity planned at Government projects and by municipalities and industries operating plants.

In the light of this record no one can honestly claim that this industry is not fully alive to its obligations nor that it is not cooperating whole heartedly in the emergency facing the country. After all, about 90 percent of the nation's generating and transmission facilities are privately owned and these facilities produce about 90 percent of all the nation's central station electricity. It is these facilities which must be depended upon for the most part if the emergency is to be met and the problem is to utilize them effectively in coordination with any other facilities that are available.

In the face of the facts the industry has a right to ask, in the national interest, that the time of its trained personnel be freed for the duration, at least, to devote itself to the urgent task it is expected to perform. Its key personnel should not be forced to spend its time meeting one attack after another nor in preparing for and attending time-consuming and expensive hearings on matters that cannot by any stretch of the imagination contribute anything to the job in hand.

Public Opinion

(*Continued from page 32*)

policies and practices of the company.

3. A system of giving contact employees the knowledge they need to be reasonable and polite and the incentive of knowing that those qualities count in pay and promotion.
4. A system of getting employee and public questions and criticisms back up through the organization so that management may know what the public thinks of the business.

The main emphasis of this program is a manner of conducting a business. Along with this goes frankness in telling the public about the company's operations. Much of this will be done by the contact employees, but much of it must be done in other ways—by advertising in newspapers, magazines, on the radio, by official company statements, speeches and many other ways.

You gentlemen in the utility business are in a different position than the normal business man. The normal business man understands and really benefits from competition. The interest and attention of the public concerned with normal business is divided considerably when the purchaser may deal with Joe Smith or Jim Doakes. In most of the territory you serve, he has only one electric company he can deal with—yours. Consequently, whenever interest, goodwill or complaints are born of

Sultry Summer Weather's YOUR BEST SALESMAN

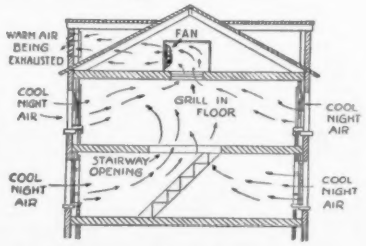
Here's Hot Weather Merchandise that Practically Sells Itself

Want to see sales resistance break down? Just give this *Breez-Air* idea a "break" when hot weather strikes. It's a natural! The logical, proven way to put any home on the comfort side *at lowest possible cost.*

Here's the idea in a nutshell. Note the simple diagram. A quiet efficient *Breez-Air* Fan is installed in the attic. Operated after sundown, it pushes out the accumulated hot air that crowds the house, draws in cool night air—provides modern cooling throughout the stuffy summer months.

Breez-Air Fans are ideal for the home. A snap of the switch, and *quietly*, these sturdy fans are on the job—bringing fresh-air comfort for the night's rest.

You're in for plenty of sales—if you get started *now*. Write or wire for full details. Effective sales promotion literature to help you cash in!



BUFFALO FORGE COMPANY
210 Mortimer Street Buffalo, New York

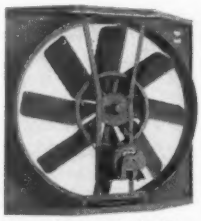
"Buffalo" **BREEZ-AIR FAN**
The Quality Home Cooling Fan

Every Coolair Attic Fan I Sell . . . Sells Another!

That's the way Edwin G. Peters, live-wire president of Gulf Radio Sales, Inc., St. Petersburg, Fla., expresses his satisfaction with Coolair fans.

"After selling several hundred attic fans, we are convinced that Coolair is the best and most profitable to handle," says Mr. Peters. "No kickbacks or trouble calls—every customer is so pleased he starts selling his friends on the fan."

Find out for yourself that it pays to sell Coolair quality. Patented sound-absorbing springs, welded all-steel construction, ball bearings in fan's hub, streamlined inlet, five-year guarantee by the pioneer manufacturer in the field—these features mean fewer service calls, enthusiastic customers . . . *and fatter profits in your pockets!*



New, improved Coolair Home-Cooling Fan; all-steel construction, patented sound-absorbing springs, streamlined inlet.

FREE illustrated catalogs, direct mail pieces, local newspaper ad mats, window displays and other sales helps are ready for you.

New Coolair Attic Package, complete with fan and automatic ceiling shutter, greatly simplifies installation.

Write today for details and franchise information. Don't delay. Fan-selling weather is here!

MAIL THIS COUPON TODAY!

American Coolair Corporation,
Jacksonville, Florida

Please send me information on the complete line of Coolair fans.

Name _____

Address _____

City _____ State _____

Coolair Ventilating and Cooling Systems

AMERICAN COOLAIR CORPORATION
Manufacturers . . . . JACKSONVILLE, FLORIDA

your service or your policies, they center wholly on you. When Mr. Page puts a percentage of good public relations as 90% what you are and 10% in telling about it, don't let the small percentage of telling about it fool you. People are busy, and naturally and properly selfish. They don't have the time or the disposition to seek out your virtues and try to understand them. This you must do for them and for yourself.

I heard a man speak in New York last Thursday bewailing the predicament of the electric light and power companies. He said the last few decades were the golden era—that five great industries had made them so—

the light and power industry
the automotive
the broadcasting
the motion picture
the telephone industry

These had all provided employment of labor and capital. Isn't it significant that the only one beset with difficulties that do not necessarily spring from the normal exigencies of business conduct is the only one that hasn't been articulate?

Factors in Employees Relations Program

(*Continued from page 30*)

deed "a flower of slow growth," and that it *can* be developed only by wise and fair leadership over a long period of time.

2. **To Promote Pride in Craftsmanship.** Unfortunately, the average employee lacks active pride in the "craft" of his job. It is, therefore, the responsibility of management's leadership to establish recognized standards of accomplishment; for example: safety programs and contests, in which accomplishment can be measured definitely; sales contests of the character with which all of us are familiar; collection ratings by our local and district offices; ratings for operators of public transportation vehicles we may operate, and many others.

Proper induction and continuing training of new employees will be conducive to building pride in craftsmanship. And it goes almost without saying that new employees should be given the ABC's about their company and about the utility business.

3. **To Encourage Business Action . . . As Opposed to Inertia.** As individuals, employees possess initiative and enterprise; as a group, they seldom display these traits to any appreciable degree. And yet, no one man can accomplish anything of importance by his own efforts alone; he must have the cooperation of people above, below and around him. An employee program operating with adequate executive support *and* participation will encourage action by the individual employee as well as the employee group.

4. **To Enlist Executive Cooperation.** Lack of cooperation among executives and heads of departments has a demoralizing effect upon the rest of the organization. (That's no new observation . . . but how many of us are guilty of being non-cooperative? Why should the individual employee, or the employee group, be expected to practice cooperation if you and I fail to set good examples?)

And finally, no employee relations program can be worth its salt unless executives of the company display initiative, enterprise and ingenuity in their leadership. Simple lip service, simple nodding of the head in approval of employee relations projects won't get the job done.

Keeping the Utility Company in Balance

(*Continued from page 29*)

through increased business. Increased rates are little thought of, even though we may be going through a period of general price increases. Not only are increased revenues in our industry seldom thought of by increased rates, but pressure for decreased rates is still much in style.

There is no doubt about you understanding me, that when I talk about "On The Way Up" I mean business is generally good and surrounded by the conditions I have outlined and that I am trying to look at the balancing of these features. Let me illustrate this "On The Way Up" route by some charts I have prepared.

(At this point, Mr. Smith presented several slides. Deductions from these slides were (1) that revenue requirement is predicated on a consumption such as can only be maintained when business is generally good; (2) that much of the present expansion program is abnormal and brought about by emergency conditions with probably non-use of these facilities in the future; (3) that there is a trend toward increased depreciation accruals and interest charges regardless of business conditions; (4) that the growth of taxes and their relation to total revenue is startling and will continue so whether business is good or bad; and (5) that the trend on the part of regulatory bodies to demand that an increased proportion of refinancing and new capital be in common stock issues makes the position of capital hazardous in the face of existing circumstances and those indicated in the future.)

We have been moving toward "the top of the hill" on the "Road Up." How far ahead it is I don't know. No one knows. We may, in fact, be there now and if we are at the top, I am glad if it will have any effect to still, stay, or stop the conflagration of human carnage

ALLVENT

For COMMERCIAL—PUBLIC BUILDING INDUSTRIAL APPLICATIONS

CERTIFIED: *100 cubic feet of air per minute for every 75c (average) invested in an ALLVENT. This is* ***LOW COST VENTILATION***

DISTRIBUTED ALL OVER THE SOUTH by Leading Electrical Jobbers

AUTOVENT FAN & BLOWER CO

1825-27 N. Kostner Ave., Chicago, Ill.

CERTIFIED RATINGS

MEMBER OF NAFM

KEEP YOUR VIEWPOINT FRESH!

Every year is a "New Era".

Constant change—something new—something better—is a characteristic of America.

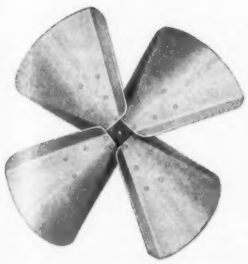
The easiest way to keep up to date in the electrical trade is through the pages of your business magazine. ELECTRICAL SOUTH gives you each month information, ideas, plans and suggestions based on the intimate contact of our editorial staff with the most successful electrical merchandisers over the South.

If you are not already a subscriber, send in your $1.00 today for a yearly subscription or $2.00 for three years. Extra postage on subscriptions to Canada, 50c per year; Foreign, $1.00 per year.

ELECTRICAL SOUTH
GRANT BUILDING
ATLANTA, GEORGIA

The FRESH-AIR MAKER

● Designed to give you a fast selling fan of high quality construction and fine appearance—Fresh-Air Makers are beautifully balanced, quiet and efficient in operation yet competitively priced—30″, 36″, 42″, 48″ diameters.



Or you can simplify your job if you build your own fans by the purchase of a proven, standard fan blade—individually packed—carefully balanced—three or four bladed type in 30″, 36″, 42″, 48″ diameters.

Write for further details and prices.

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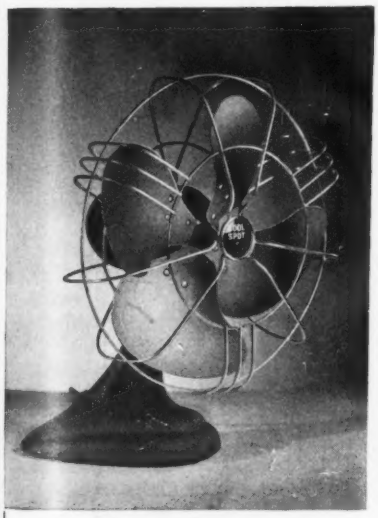

ONE OF THE SIGNAL 1941 BEAUTIES

Fan shown here is No. 562 10″ Oscillator

Signal's 1941 fans are the ultimate in beauty, quality and moderate price.

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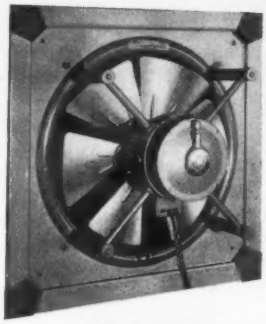
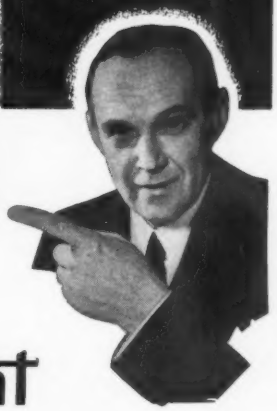
16 GAUGE METAL BLADES!
FAMOUS ENGINEERING STURTEVANT!





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You get the last word in ventilating fan construction—when you specify Sturtevant.

You get the product of the World's Largest Manufacturers of Air Handling Equipment.

You get all of the advantages which only 81 years of air engineering experience can assure.

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that is going on throughout the world. What I mean by arriving at "the top of the hill and looking down on the other side" is the arrival of that inevitable time of depression which has followed every similar period in history and will follow this one, whether it be one, five, or ten years hence.

The summary of our expense problems when we arrive "at the top of the hill" must include: labor costs greatly increased and probably permanent; taxes absorbing a record percentage of each revenue dollar; charges to income for depreciation at an all time high, because of added property in service; interest charges higher because of additional sums borrowed to pay for the new plant additions, with no or little further interest savings possible because the new money has been borrowed and old obligations refinanced on virtually a rock bottom money cost.

With this background there can be little response to efforts of management to reduce increased expenses. Therefore, a correspondingly high level of revenues must be maintained either by increased sales or higher rates on declining sales. Volume of sales in depression periods is difficult if not impossible to hold particularly with industrial consumers. The public mind at the present time is far from appreciating, and accepting as necessary, rate increases that would give any substantial aid to the solution of the problem.

While my picture thus far may seem black, much can be done, in my judgment, to smooth this "Way Down." We have heard much these days as to what our sales policies should be, i.e., whether there should be a reduction of promotional activities in the face of the future. My answer is "No." There are three general classes of sales—industrial, commercial and domestic. In my judgment there never has been a more opportune time to get results from intensified sales effort than during this period. As to our industrial class of patrons, especially small industry, we have much existing competition to meet and more competition is certain to develop from time to time.

Old, established, regularly operated industrial plants will be able to share liberally in the volume of business now to be had and will provide an opportunity for us to intensify our sales effort in assisting such industry to modernize economically, and efficiently equip their plants to best meet the new conditions "On The Way Down." These industries have an old established trade and with proper efficiency will be able to operate under very adverse conditions.

The commercial class of patron —the department store, office building, restaurant, theatre, and the like, is the first to receive a share of the so-called boom dollar placed in circulation. This increased business will quickly place them in position to jump the hurdle of equipment cost. We have so much to offer this class of customer in new, improved, electrical uses, such as air conditioning, good lighting, (including fluorescent in its field of application), counter cooking, and service units of various kinds. It is in this field where these applications find ready acceptance, that improved business conditions now make purchase money available.

In the domestic field improved business conditions place new dollars in the home, and make possible the purchase of the things the family has been wanting. It is in the home that customer use will stay longest as the road hardens "On The Way Down." All that I have said about sales, summarized, is that the best time to sell anybody anything is when they have money to buy.

The one class of customer that will give us most concern is the strictly defense industry. It is emergency and government dominated, and must rightly be given preferential service. This kind of industry will quickly warp and dislocate our business. It is the type of industry, in the interest of humanity and civilization, that will never open up at all or will operate the shortest possible time. It is the class of industry which is purely a part of the cost of national defense, and our installations to serve it should be set up with our government on a liberal plan of amortization.

Every effort should be exerted to bring about an enforced and coordinated understanding between public, regulatory bodies and ourselves as to our problems on the road ahead to "the top of the hill" and "Then Down." Our increased revenue is necessarily temporary "On The Way Up" and our expenses, fixed charges, taxes,

GREENLEE BENDERS

EASIER AND FASTER FOR THE MAN ON THE JOB

Ask the man who knows . . . the operator right out on the job doing the bending . . . and he'll tell you that bending conduit with the Greenlee Hydraulic Bender is even easier than it looks. To bend conduit requires power . . . approximately 31 tons for 4-inch conduit . . . and Greenlee Hydraulic Benders have the power. The No. 770 Bender, for 1¼ to 3-inch conduit, has 25 tons of easily developed power, while the No. 775 Bender for 3 to 4½-inch conduit, has 40 tons of hydraulic power. One man can quickly develop this power by simply pumping the handles. These light, portable benders are built compactly into one unit, are easily carried to the job and set up, and will not move and twist about when in use. Write today for our new S-116 Bender Booklet . . . it will show you how you can cut bending costs on every job.

The No. 770 Bender, shown above, is designed to make bends in 1¼, 1½, 2, 2½, and 3-inch conduit, while the larger No. 775 Bender will bend 3, 3½, 4, and 4½-inch conduit and pipe.

GREENLEE TOOL CO., 1707 Columbia Ave., ROCKFORD, ILL.

etc., are unfortunately quite permanent as we see them, so we need liberal revenues to strengthen our reserves, and should develop a sympathetic public understanding to assist us in helping solve our problems with rate increases when necessary. The public is generally fair, and when it understands the need, will accept its share of the burden.

Investor's Viewpoint On Utility Finance

(Continued from page 27)

industry stages a comeback, the artificial gas industry for example, but such are the exception rather than the rule.

But you may well ask, isn't it asking too much of a company to retire its existing bonds while its business is growing and it is in need of additional capital? There are, it seems, several answers to this question. From the investor's point of view it may be said that if a good start is not made in retiring bonds while the business is growing these bonds will probably never be retired. Also one may point out that it is the universal practice of municipalities to retire their bonds either through serial maturities or sinking funds. This practice has been carried over into the financing of municipally owned public utilities. Because all of the bonds of the Los Angeles Bureau of Power and Light are set up for systematic repayment over the next 40 years does not mean that the capital needs of that system are believed to be at an end. It no doubt expects to borrow to meet at least a part of these needs in future. This procedure of constantly repaying and reborrowing may at first glance seem a troublesome and wasteful method of finance. However, from the point of view of the life insurance investor whose paramount concern is the preservation of his capital it seems highly desirable. In the first place, assuming the rate of repayment is rapid enough, it tends to constantly increase the ratio of property value to debt. If the industry ever reaches a static condition the investor has assurance that the debt will be reduced. Also the investor is given a chance, when his money is paid back, to reconsider the terms on which he cares to reinvest.

How does this compare with the situation prevailing in private utility finance? A short time ago I

Look Out Your Own Window

SEE THE HARVEST OF PROFITS . . .
YOURS IF YOU'LL JUST TELL PEOPLE ABOUT

General Electric *AUTOMATIC* Water Heaters

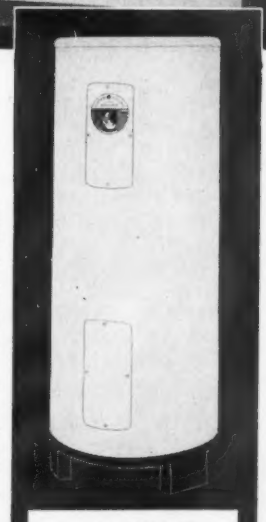
LOOK OUT NOW AND SEE THE MANY PLACES WHERE HOT WATER IS NEEDED!
EVERY ONE IS A PROSPECTIVE SALE FOR YOU!

There are profits for the picking—easy profits and plenty of them—right along "Main Street" and all around town. Just look out your own window and you'll see plenty of places that need a water heater. A water heater is the *one* major electric appliance which has both a domestic as well as a commercial market. There are at least 18 different places where an automatic electric water heater can be sold.

And a General Electric Water Heater is built to give the best and lowest-priced service in each and every one of these places. The famous G-E Calrod unit is immersed in the water for most efficient heating—automatic adjustable Thermostats give a constant supply of hot water—heavy mineral insulation holds the water at the desired temperature day and night.

Tell your General Electric water heater story to more people and you will be surprised at the *plus profits* you'll reap.

Send for your free copy of a new selling manual—telling 6 easy steps to convert prospects into sales. Send for yours today!



Round Model Illustrated. G-E automatic electric water heaters are available in sizes from 2 - 140 gallons capacity and in round, square and table top styles.

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FOR G-E's NEW
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MANUAL ON SELLING G-E AUTOMATIC WATER HEATERS

GIVES 6 EASY STEPS FOR MAKING QUICK SALES

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For Perfect
REMOTE
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- Starter may be inserted or removed without disturbing lamp.
- Cuts down lamp breakage.
- May be mounted at any distance, wherever most convenient.
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made a study of the debt retirement provisions in 116 large bond issues making up over half the debt of all electric operating companies in the country. These bonds were all comparatively low coupon issues put out since 1935. Most of them were term issues running for 30 years. 45% of them by amount had definite sinking fund provisions of some sort. That means that over half of these bonds by amount lacked such definite sinking fund provisions. It just seems to me that a sinking fund attached to a bond issue of a private industry is definitely on the weak side if it fails to cut that issue in two over a thirty-year period. Yet, in studying these 116 bond issues, I found that only 5 had sinking funds strong enough to reduce their bond issues by as much as 45% in 30 years. Two of the companies with bonds on this short honor roll were Dayton Power and Light and Cincinnati Gas and Electric. At the other end of the scale some sinking funds would only produce a 15% reduction before maturity.

Arkansas Association Meets at Hot Springs

(*Continued from page 23*)

Company, was chairman of the gas section.

Speakers and their subjects at the Gas Session were: R. A. DeLong, Fort Smith, auditor for the Twin City Pipe Line Company, "Accounting Transitions"; Thad W. Rowden, Jr., Fayetteville, district sales manager, Arkansas Western Gas Company, "Selling Forced Warm Air Heating Equipment in Arkansas in 1940"; T. W. Robertson, Shreveport, La., engineer, Arkansas Louisiana Gas Company, "Eliminating Hazards in Commercial and Public Buildings by Means of Systematic Surveys".

Speakers and subjects at the Electric Session were: John Wallis, Oklahoma City, system planning engineer, Oklahoma Gas and Electric Co., "Methods of Load and Voltage Survey on Distribution Systems"; H. R. Finner, St. Louis, engineering sales, Westinghouse Electric and Manufacturing Company, "Fluorescent Lighting Progress To Date."

W. F. Thomas, of Fayetteville, manager of the Southwestern Gas and Electric Company, was elected as the new president to succeed Mr. Thurston. A. B. Harper, president, Fort Smith Gas Company, was elected first vice president; C. S. Lynch, Pine Bluff, executive vice president, Arkansas Power and Light Company, second vice president; and R. E. Ritchie, Little Rock, vice president and division manager, Arkansas Power and Light Company, was re-elected secretary-treasurer.

Under the chairmanship of Mrs. Walter S. Van Sickel, of Fort Smith, an interesting and entertaining program for the ladies was held while the men were in the convention sessions.

Connecting Diagrams For Lap-Wound Motors

(*Continued from page 40*)

from 7 to 20 points.

Overload capacity is greatly increased by operating at over voltage, as with 10 per cent over voltage, the overload capacity is increased about 20 per cent; at 25 per cent over voltage, it may be as high as 45 per cent. Thus where motors are overloaded, changing the connections to produce an over voltage condition would be beneficial in some respects.

Per cent slip is dependent upon the rotor copper losses, and with over voltage the rotor copper losses are reduced. Thus the slip is increased about 7 to 15 per cent for 10 per cent over voltage, and about 35 per cent for 25 per cent over voltage. In general, the slip for the same power rating and apparent efficiency varies inversely as the square of the applied voltage.

Revolution per minute at full load is dependent upon the per cent slip. For 10 per cent over voltage, the rpm may increase one per cent over the original rating, or to 1-1/2 per cent increase for 25 per cent over voltage. Thus, the change in full load rpm is slight.

The next article will present the twelve pole, three phase, nine lead, two or four parallel, star and delta connecting diagrams. The discussion on the effect of over voltage will be continued.

Calculating Cooling Coil Capacity

(*Continued from page 38*)

peratures run between 10 degrees and 20 degrees F. This temperature is usually arrived at in about this manner: must high humidity be maintained? If such is the case a 20 degree differential between the box and refrigerant is better than a 30 degree differential. Or

assuming all other factors remain the same, the higher the refrigerant temperatures, the higher the relative humidity of the box will remain.

However, as the refrigerant temperature is raised, the differential will be lowered and the square foot of coil surface required will be increased. This will, in many cases, raise the cost of installation, and too high a refrigerant temperature may require more coil than can be successfully installed in the coil space or in line with good practice.

The next procedure is to choose a coil that will balance with the compressor or have an equal capacity under the same operating conditions. Since the condensing unit ratings are for 2/3 operation, we should multiply this by 3/2, or 1.5, to get the continuous capacity. The purpose of balancing the coil against the continuous capacity of the compressor is because the coil, with a very small exception, does not pick up any heat load except when the compressor is running. Thus the continuous capacity of the compressor would be 3,120 x 1.5 or 4680 btu per hour. With the condensing unit doing all of it's work when it is running, the coil must necessarily have the heat extracting capacity of supplying the load to the condensing unit as fast as it can take it away. An unbalanced job is sure to give a wide difference in temperature from what was expected. It is more important that the compressor balance with the coil than with the box load, providing the box load is nearly the same.

The next operation is to select the coil with the proper area for handling this job. The formula for calculating the coil area is:

$$A = H \, (K \, X \, T_D)$$

where

A = required area of coil surface in square feet;

H = the coil capacity required, that is, the continuous capacity of the unit;

K = btu absorbed per square foot of coil surface, per degree difference in temperature between box and refrigerant temperature, or in this case, as taken from a standard table for walk-in coolers, .8; and

T_D = difference in temperature between box and refrigerant.

In this example,

$$A = 4680 \, / \, (.8 \times 25)$$
$$= 234 \text{ square feet}$$

It might not be practical to get one coil this large into the cooling

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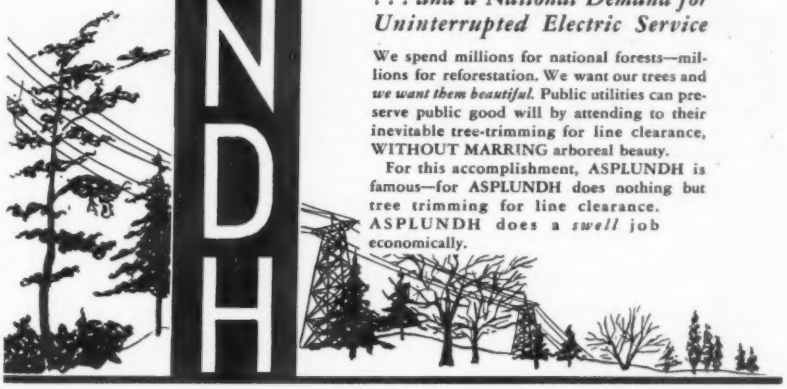
. . . and a National Demand for Uninterrupted Electric Service

We spend millions for national forests—millions for reforestation. We want our trees and *we want them beautiful.* Public utilities can preserve public good will by attending to their inevitable tree-trimming for line clearance, WITHOUT MARRING arboreal beauty.

For this accomplishment, ASPLUNDH is famous—for ASPLUNDH does nothing but tree trimming for line clearance. ASPLUNDH does a *swell* job economically.



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TREE TRIMMING FOR LINE CLEARANCE EXCLUSIVELY

This Fan Control is built for

SUMMER HEAT

The well planned arrangement of Ward Leonard Speed Regulators provides circulation of air around resistance elements to dissipate the generated heat. They will therefore operate continuously at any speed setting, in the hottest weather, without overheating. Ward Leonard Motor Speed Regulators include everything from small ring type rheostats for window ventilators to the heaviest industrial blower controls. Multi-Speed Motor Starters available for air conditioning.

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C. B. Rogers, Zahner Building, 1000 Peachtree St., N.E., Atlanta, Ga.
Brance-Krachy Co., 4411 Navigation Bldg., Houston, Texas
Electron Engineering Co., 1811 Masonic Temple, New Orleans, La.

WARD LEONARD

37 SOUTH STREET MOUNT VERNON, N. Y.

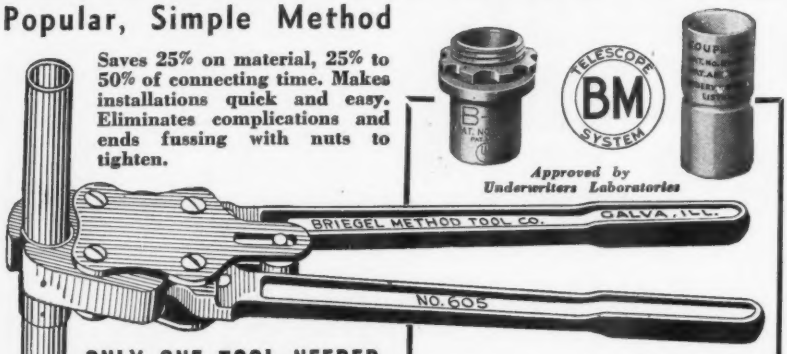
ELECTRIC CONTROL DEVICES SINCE 1892

Save 25% . . . in Material and Connecting Time

WITH B-M CONNECTORS AND COUPLINGS

Popular, Simple Method

Saves 25% on material, 25% to 50% of connecting time. Makes installations quick and easy. Eliminates complications and ends fussing with nuts to tighten.



Approved by Underwriters Laboratories

ONLY ONE TOOL NEEDED

Costs you only $1.25 for the patented B-M indenter (½" size handles 80% of all installations). Just two squeezes, and you have a smooth, neat connection. No other tools required. This tool can save you many times its cost on the first job.

STRONG, NEAT CONNECTIONS

You welcome the speed and ease that the B-M system puts in your hands. These fittings give you complete, *well finished work* in a hurry—on all average jobs (they're non water-tight).

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Triangle Conduit & Cable Co., Elmhurst, New York City.

BRIEGEL METHOD TOOL CO., Galva, Ill.

compartment so that two coils of 117 square feet surface area might be used.

Before deciding on the coil, we should remember that space in the cooling compartment will be needed for the expansion valves and for making tubing connections and bends; at least 12 inches should be allowed for this purpose. Without going out and measuring the cooling compartment, we know that the box has 4-inch cork insulation and with a regular wood facing on each side of the cork we would consider it a 6 inch wall so that this 8 ft. x 10 ft. box would have an inside floor area of 7 ft. x 9 ft. Subtracting from the length of 108 inches the 12 inches for accessibility in connections and expansion valves, we have a maximum space of 96 inches.

The maximum length of the coil can be 96 inches but for good practice we should set a minimum length. For this, 70% of the bunker length is suitable, which is 76 inches. One other dimension of the coil to consider is that the width does not extend over into the hot air flue.

There will be occasions when a coil of exact dimensions and capacity will not be available. The only solution then is to choose the next closest size. This example has been taken from a box for normal service; unusual conditions such as abnormal load or box in poor shape should always be considered.

Lighting Engineers Hold Spring Meetings

(*Continued from page 37*)

ufacturing Company discussed illumination methods and equipment for plant protection and industrial production.

Changes that have taken place in lighting methods were discussed by Frank B. Lee, division engineer of St. Louis for General Electric. He discussed the design and application of fluorescent lighting particularly.

R. P. Burrows, assistant manager of the sales promotion department of General Electric, presented statistics to show market trends in fluorescent lighting, and Ray A. Siedle, manager of the lighting division of the Grand Rapids Store Equipment Company, told how proper illumination increases retail sales in any line by enabling the customer to "see what he's getting."

W. A. Feuillan, Jr., chairman

DEPENDABLE
ATTIC VENTILATION *with* Paragon TIMERS

Paragon Series 1200

PARAGON all-electric Timers, for automatic control of attic fans are reliable, dependable and trouble-free. The mechanism is timed and operated by a slow speed, self-starting synchronous motor. No clock works of any kind to get out of order. Approved by Underwriters. Easy to install. Setting between 45 minutes and 9¼ hours. Only $9.85 list. Available through leading electrical supply jobbers.

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Builders of Control Instruments since 1905
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INSTANTANEOUS *Electric* HEATERS

HOT or COLD WATER from the SAME FAUCET—when you want it.

• • • The Instantaneous Electric Water Heater is not a portable lamp socket device, but—as shown—is a compact, self-contained apparatus (10½x4¼ inches). Quickly and inexpensively installed. Operates on AC.

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DISTRIBUTORS WANTED

Mfg. By THE ELECTRIC HEATER COMPANY
BRIDGEPORT, CONNECTICUT, U. S. A.

NEW LEADERS *for* MORE SINK and KITCHEN SALES

YPS adds 4 new models to its line to give its dealers a sales leader in every size and an 11 model step-up sales program.

Beauty — High Quality — Permanence has been designed and built into every YPS Cabinet Sink by the largest manufacturer of cabinet sinks and storage cabinets for the mass market.

YPS Cabinet Sinks have major appliance sales appeal and lead to complete kitchen sales.

The Program back of the Product puts PROFIT into YPS KITCHEN MERCHANDISING

- Simplified "Min-a-Kitchen" method of Kitchen Planning
- National Advertising
- Complete Flexible Line
- Sales Promotion and Training Program
- Warehouse Stocks Coast to Coast

MAIL THE COUPON

YOUNGSTOWN PRESSED STEEL DIVISION, Dept. 65
Mullins Manufacturing Corporation, Warren, Ohio
Please send me complete information on the YPS plan for my territory.

Name.....

Address.....

City.....State.....

HERE THEY ARE! THE NEW LINE OF

RACOLET

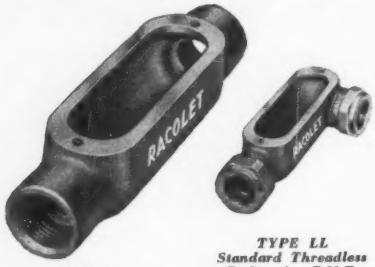
..These Conduit Bodies, Standard and F. S. Types are the newest addition to the famous, nationally known RACO ● ALL-STEEL Line. Measuring up in every way to RACO ● ALL-STEEL'S ● reputation for quality, the new Racolets embody the finest workmanship. The bodies are malleable iron, finely finished with a heavy coating of cadmium. Cover openings are surface ground . . . deep, clean-cut tapered threads. Hub edges are chamfered for easy introduction of conduits.

These new Racolets are modern and streamlined. There's plenty of room as there are no protruding screws or ears. Backs are semi-flat for rigid and uniformly flat mounting.

Available in threaded type for rigid conduit and threadless type for E.M.T. All the necessary covers are included in the line.

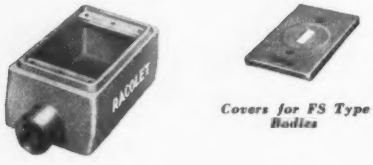
Explosion-proof fittings for hazardous locations, too, are found in this new line . . . including Line-Sealing fittings. And, of course, there are Vapor-Proof Fittings . . . both rigid and pendant types.

Write today for the new catalog, describing this new line. It's yours for the asking.



TYPE C
Standard Threaded Bodies for Heavywall

TYPE LL
Standard Threadless Bodies for E.M.T.



Covers for FS Type Bodies

TYPE FS
FS Bodies Available in 1-, 2-, and 3 Gangs for Heavywall and E.M.T.

Moulded and Metal Covers to Fit Standard Bodies

Explosion-Proof Fittings for Hazardous Locations

Vapor-Proof Fittings. Rigid and Pendant Types

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ALL-STEEL PRODUCTS
Switch Boxes • Outlet Boxes • Cutout Boxes
Cabinets • Conduit Fittings
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of the New Orleans Chapter presided at the conference.

Southwestern Group Meets

In Dallas, Texas, the Southwestern Section, I. E. S., held a three-day meeting, April 17-19. Dallas is now headquarters for Region G of the Illuminating Engineering Society, which includes the states of Colorado, New Mexico, Oklahoma, Texas, Arkansas and part of Kansas. P. M. Rutherford, of Dallas Power & Light Co., regional vice president represents this region.

Included on the program were addresses by I. E. S. President Cameron and Samuel Hibben, of Westinghouse.

Several well-known Dallas architects had a place on the program, discussing lighting's relation to architecture, architectural views on residential lighting, etc. Among other interesting subjects discussed were those on the use of reflector buttons for highway delineation, better dormitory lighting, color photography and color printing, residential lighting practices, garden and yard lighting, fluorescent lighting, light conditioning activities, adequate wiring, sale of store lighting and special lighting equipment, etc.

A feature of the week, not a part of the conference, but closely allied with it, was the "Infra-red Institute", presented by Fostoria Pressed Steel Corporation in cooperation with Dallas Power & Light Company. It was held on April 15 and 16, in the D. P. & L. auditorium. All I. E. S. members, lighting and power engineers and salesmen had been invited to attend the Institute.

Of a lighter vein were the president's reception, dinner and dance, on Friday evening. Something new for these conferences was a stag party on Thursday evening, providing a bit of informal fun for the men visitors.

New Core Steel Offers Advantages

(*Continued from page 53*)

of these changes, the total loss in service is lowered; and as a result of lower coil temperature gradients the transformer is better able to stand the severe overload peaks imposed by large appliances.

Maintenance Made Easier

The newly developed magnetic material benefits the transformer user in still one other way. Distribution transformer cores made from it are assembled in two pieces that can be taken apart easily for replacement of coils, if it becomes necessary.

One typical power company finds it uneconomical to repair a transformer smaller than the 10-kva size, because labor costs offset savings. With the simplified Hipersil structure, it probably would be economical for the utility operator to keep a stock of spare coils and repair all transformers, regardless of size.

Florida Contractors Hold Annual Meeting

(*Continued from page 44*)

chinery Corporation, gave an interesting resume of a trip recently made by airplane to 18 South American countries. He said transaction of business with most of these countries will be difficult until we learn to figure in meters and price merchandise in their money system. He said the Germans in those countries speak five languages, placing others at a disadvantage. He also pointed out that most of the countries are comparatively poor.

Need for complete accounting systems due to new tax measures was pointed out by M. A. Montenegro, of the Florida Institute of Accountants. He recommended the various accounting systems furnished by the national association.

Contractors were invited to bring their wives and a program was arranged for the ladies which included lunch at a famous Spanish restaurant, a theater party, and a trip through Dupree Gardens. The closing event for all was a barbecue at Palma Ceia Country Club.

At a closed meeting on the afternoon of the second day R. C. Bigby, of Tampa, was elected secretary to fill the unexpired two-year term of F. J. McGinnis, Palm Beach, who resigned last July. Mr. Bigby was already treasurer and now holds both jobs. W. O. Henderson, Jacksonville, and Walter Monroe, Tampa, president and vice president, have another year of their term to fill.

Four members of the executive committee were elected. District 1, R. A. Ragsdale, of Tallahassee; District 2, W. T. Poole, Jacksonville; District 3, Harold Lang, Orlando; and District 5, Charles Kroegel, of Sebastian.

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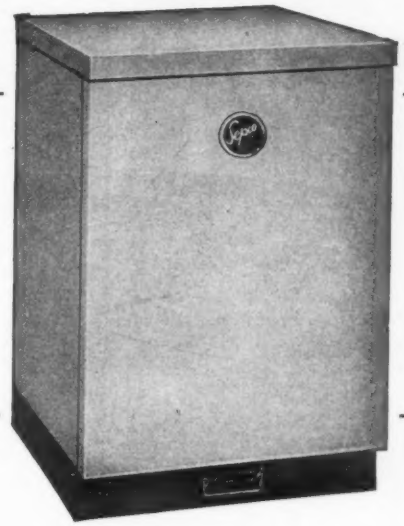

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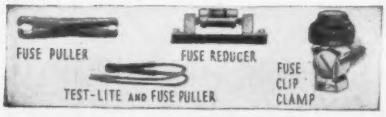

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IDEAL COMMUTATOR DRESSER COMPANY
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"SALES OFFICES IN ALL PRINCIPAL CITIES"

Ventilating Fans "Come Out of the Kitchen"

(*Continued from page 21*)

installation, plus the cost of the fans, the company will take the fan out and deduct its net cost, if he is not satisfied. While in the past some jobs have not measured up to the expectations of the owner, due largely to faulty engineering, the customer today more likely helps sell other jobs. Several cases are reported where a furniture store, for example, installed fans on one floor and liked the results so well that the next year similar installations were made on other floors.

In engineering a job, several points should be taken into consideration, according to Mr. Holmes. He said that normally comfort conditions can be provided by an air change every minute or by an air movement of 60 feet per minute. Proper distribution and air velocity are important factors just as is the degree of air change. Much depends on the size and dimensions of the building, including the ceiling or roof height. Mr. Holmes said it was better as a rule to have the fans in the end and rear of the building, but if the street is too hot and dusty it may be better to put fans up front and draw the air from the back. In a few installations the fan may be geared to blow in instead of out. The fan openings must be protected against the weather and installed so they may be closed in the winter. In some cases burglar bars need to be placed over the opening.

Whatever may be the problem, and many of these are discussed in literature furnished dealers by the manufacturers, Mr. Holmes finds it advantageous to make up a blue print on other than the simplest installation. Carpenters need a plan to go by as do the installing electricians. It is quite helpful to the salesman to know something about building construction so that he can give a rough estimate on a job including the construction cost as well as that of the fan, motor and controls. However, in getting down to exact figures it is probably best to call in a carpenter or contractor to give an estimate.

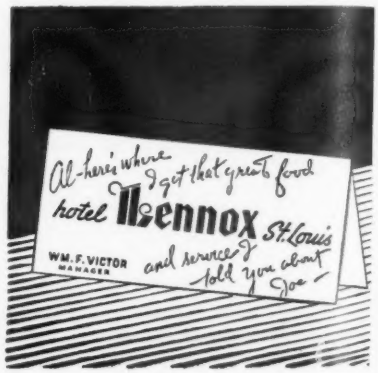
There is one point on which Mr. Holmes is insistent in engineering a job and that is that baffles or inverted transoms be used to direct the air flow down as it enters the building to be cooled. Otherwise the air may pass too close to the ceiling and merely carry away the heat from the lights without giving occupants of the building the direct benefit of air motion. In some cases, he said, the fans may be placed low. In a church, for instance, it is necessary to get the air motion low and not up against a high ceiling.

Profit Sharing Plan For Paying Salesmen

(*Continued from page 19*)

the commercial man's monthly sales quota.

The commercial man receives a straight commission on his sales, rather than a share of the profits, because commercial units are so priced that there is little or no fluctuation in the net profit made on sales, Mr. Wetherbee points out. In other words, a commercial unit of specific size carries a more or less constant net profit, with the same basic costs entering into each sale, contrary to the case of the domestic unit. Hence it is comparatively easy to arrive at a constant net earning for the sales-



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man, which can be paid in the form of a direct commission on the gross sale.

Although the company encourages the salesmen to draw their earned profits or commissions at the end of each month, it will pay a man what is due him on each sale as soon as the sale has been completed, if he needs the money.

The commercial salesman's sales quota, based on his salary of $65 a month, is $2,000. If he sells that amount he is considered to have earned his salary and to have performed satisfactorily. His commissions will have been ample to give him a living income and the company will not have lost on his salary. Under that, he is not considered a satisfactory man, and above that, he is considered better than the average.

Wiring a Modern Airport Building

(Continued from page 17)

the first and second floors have this raceway plug-in. Light plugs were placed every 18 inches in the offices.

Lighting fixtures in lobby and halls are flush-type, with semi-indirect units in some of the offices. On the lobby floor there is outlined in terrazzo, a huge map of the greater part of North America, the city of Dallas being indicated by a 6-inch glass star. This map is so arranged that Dallas is at the crossing of the two center lines of the lobby.

Wiring installation had to include adequate lines and feeders to care for numerous users of current. For example, there are three dispatching rooms, radio control room, radio repair shop, U. S. Weather Bureau, with recording instruments on the roof, glass-walled air traffic control tower, and numerous offices and rooms, as follows:

Airport manager's offices, baggage room, express room, post office, cafe, customs room, air line companies' offices, ticket and reservation offices, barber shop, lockers and recreational facilities for pilots and for hostesses and women employees, floodlighting equipment for part of building facing street, and flood and other outside lighting on the side facing the airport, not to mention the various markers and landing lights; and the air-conditioning equipment, heating plant, compressors, switchboards and controls in the basement.

Small-Diameter Wire Promotes Modernization

(Continued from page 16)

ance of cooler foot-candles. A four-lamp 48-inch shielded fluorescent luminaire (Curtis No. 1240) was installed for each eighty square feet of working area to provide a minimum of 30 foot-candles.

As may be seen from the accompanying "before" and "after" photographs, marked improvements were made in the decorations, furnishings, etc., as well as in the illumination.

Former room conditions of time-stained and dark colored ceilings and walls were replaced with flat white ceilings throughout and wall finishes of light ivory and pastel shades of blue and green. Light-colored Venetian blinds replaced mahogany colored blinds and new floor coverings of mottled grey asphalt tile were installed. In line with the general modernization many offices purchased new desks and other office fixtures.

The brief outline in tabulated form indicates some of the outstanding results obtained.

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101. SERVICE EQUIPMENT AND LOAD CENTERS—Service Equipment, Load Centers and Panelboards assembled with Type AC circuit breakers are listed in this new publication. In addition to considerable general information, it includes specifications and price data. Frank Adam Electric Company, St. Louis, Mo.

102. BUSDUCT AND ACCESSORIES—This sixteen-page booklet gives complete descriptive data and specifications on Busduct Distribution Systems for Light and Power. Of particular interest is the suggested specification for Feeder Busduct Distribution Systems. Frank Adam Electric Company, St. Louis, Mo.

103. SWITCH AND OUTLET BOXES—Cubic inch capacity is given for many types and sizes with interpretation of National Electrical Code. New Racolets in many types. All-Steel-Equip Co., Aurora, Ill.

104. SHOP EQUIPMENT—Shop Boxes, Stacking Boxes, and Taper Pans for handling and storing small parts. Tool Boxes, Tool Cabinets, and Bench Drawers. Illustrated catalog shows many uses. All-Steel-Equip Co., Aurora, Ill.

105. COOLAIR HOME-COOLING FANS—FORM 141—Complete descriptions of 1941 Coolair single and twin attic fans, window fan and new automatic ceiling shutter. Also contains valuable installation suggestions. Designated as Form 141. American Coolair Corp., Jacksonville, Fla.

106. COOLAIR ATTIC PACKAGES—FORM 241—Complete descriptions of 1941 Coolair single and twin attic packages, including fan, vent box and newly developed gestions. Designated as Form 241. American Coolair Corp., Jacksonville, Fla.

107. COOLAIR PRICE SHEET—FORM 341—Complete performance data, dimensions, prices and shipping weights on 21 sizes of Coolair home-cooling and commercial fans; also blowers and accessories. Designated as Form 341. American Coolair Corp., Jacksonville, Fla.

108. AMARINE NON-LEADED SUBMARINE CABLES—FORM 6118—An attractive, 16-page booklet on Submarine Cables, with illustrations of various applications and descriptions of typical installations. Copies may be obtained by writing the American Steel & Wire Co., Rockefeller Bldg., Cleveland, Ohio.

109. TIME SWITCHES—Folder on Time Switches with a short description of the new line of Time Switches ranging from 770 to 4,950 watts per pole in capacity, and in single, double, and triple-pole types. Both single-throw and double-throw models are available. Automatic Electric Mfg. Co., Mankato, Minn.

110. AUTOMATIC FLASHERS — A complete line of Flashers including all types and arrangements of circuits for every conceivable flashing effect. These include both standard or heavy-duty models, and a line of Utility models which are just as ruggedly constructed and as durable, but are designed for small loads where the more expensive installations of heavy-duty Flashers are not warranted. Automatic Electric Mfg. Co., Mankato, Minn.

111. NEW CORY CATALOG—The new merchandising features presented in this new catalog are free spare glass with famous CORY Assortments—also the new CORY Glass Filter Rod-Funnel Holder Dollar Combination which makes these needful accessories available to all users of Glass Coffee Makers. Glass Coffee Brewer Corp., 325 No. Wells St., Chicago, Ill.

112. TELEPHONE & CODE CALL EQUIPMENT—A new Bulletin No. 108 is available describing the new Couch "Autophone" System of automatic telephones which incorporates valuable features among which is a Code Call circuit which may be used in conjunction with the telephone system. This system is designed for industrial, commercial and institutional buildings. S. H. Couch Company, Inc., North Quincy, Mass.

113. INTERPRETING THE NEW CODE IN TERMS OF NEW BUILDING WIRES—A new booklet describing the rulings on thin, heat-resisting and synthetic insulations are carefully simplified. The ratings of the newly recognized types of wires and the new ratings for Type R are graphically shown in tables for both the new and rewiring classes of work. General Cable Corporation, 420 Lexington Avenue, New York, N. Y.

114. IDEAL PRODUCTS CATALOG — A special 25th anniversary catalog has just been issued describing the complete line of Ideal Products. Electrical Contractors, Motor Rewinders, and Industrial Maintenance Electricians will be particularly interested in this comprehensive publication. Ideal Commutator Dresser Co., 1270 Park Avenue, Sycamore, Ill.

115. FLUORESCENT LIGHTING ACCESSORIES—Spring Bulletin No. 2, describing and illustrating complete Lloyd line of Fluorescent Lamp Holders, Starters, Starter Sockets and Holder and Socket combinations. Lloyd Products Company, Providence, R. I.

116. "PLUG-IN" STRIP CATALOG—This twenty-eight page booklet includes a wide range of application data and specifications on "Plug-In" Strip. Constructors will find the actual insulation diagrams and instructions of particular interest. National Electric Products Corp., Pittsburgh, Pa.

117. MECHANICAL CONNECTORS—First Aid for electrical systems through the use of mechanical connectors is the subject of an interesting twenty-page booklet now available. In addition to specific construction and sales of the new "Gorilla Grip," this booklet describes a wide range of mechanical connectors for every size and purpose. National Electric Products Corp., Pittsburgh, Pa.

118. HOME VENTILATION—FORM 347—Describing benefits of home ventilation with methods of sizing and installing units. Six pages. Profusely illustrated. Schwitzer-Cummins Company, 1145 East 22nd Street, Indianapolis, Indiana.

119. COMMERCIAL VENTILATION—FORM 402—A four-page bulletin pointing the way to increase dealer profit through the sale of ventilation to stores, restaurants, taverns, etc. Illustrated. Schwitzer-Cummins Company, 1145 East 22nd Street, Indianapolis, Indiana.

120. SQUARE D COMPANY announces the Spring issue of the Square D Digest, dated April, 1941. This condensed catalog contains listings and the latest prices of many Square D products, including Safety Switches, Service Equipment, Multi-breakers and other Circuit Breakers, Panelboards, Motor Control and Pressure Switches. Square D Co., Detroit, Michigan.

121. NEW WIRE CATALOG—A new catalog just issued by the United States Rubber Company contains complete specifications for every type of building wire and cable—single conductor and multiple conductor, rubber insulated and synthetic insulated, fibrous covered and lead covered. United States Rubber Co., Rockefeller Center, New York, N. Y.

122. 100-WATT FLUORESCENT LUMINAIRES FOR INDUSTRY—Designed especially to furnish higher illumination intensities in industry, new 100-watt fluorescent luminaires are described in a 4-page leaflet, F-8604, recently announced by Westinghouse Electric and Manufacturing Company. A copy of F-8604 may be secured from Department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

123. NEW FOLDER DESCRIBES WATER COOLERS—Water coolers for general industrial and office use are described in a new 8-page illustrated folder announced by Westinghouse Electric and Manufacturing Company. Copies of folder 1WC-0201 may be secured from department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

124. FOUR NEW Y. P. S. CABINET SINKS are shown on a new two-color wall poster. There are provisions made for prices on each model and the poster carries full description of each sink. Folder designated as No. 1054. Youngstown Pressed Steel Division of Mullins Manufacturing Corporation, Warren, Ohio.

125. Y. P. S. SINKS—Folder No. 1056 shows the complete line of eleven sinks now manufactured by this company. These eleven sinks vary in price from the lowest priced sink of standard specifications to the greatest dollar value in 66-inch double bowl sinks. Youngstown Pressed Steel Division of Mullins Manufacturing Corp., Warren, Ohio.

126. WIRING DEVICES—"Arrow" catalog No. 27 and "H&H" catalog No. "X". 100 pages, lists the complete line of quality, dependable wiring devices, including switches, receptacles, sockets, and plug material. The Arrow-Hart & Hegeman Electric Company, Hartford, Conn.

127. MOTOR CONTROL APPARATUS—"Arrow—H&H" catalog No. 8, 94 pages listing Magnetic and Manual Starters, Push Button Stations, Enclosed Switches, Relays, Service Equipment and Circuit Breakers. The Arrow-Hart & Hegeman Electric Company, Hartford, Conn.

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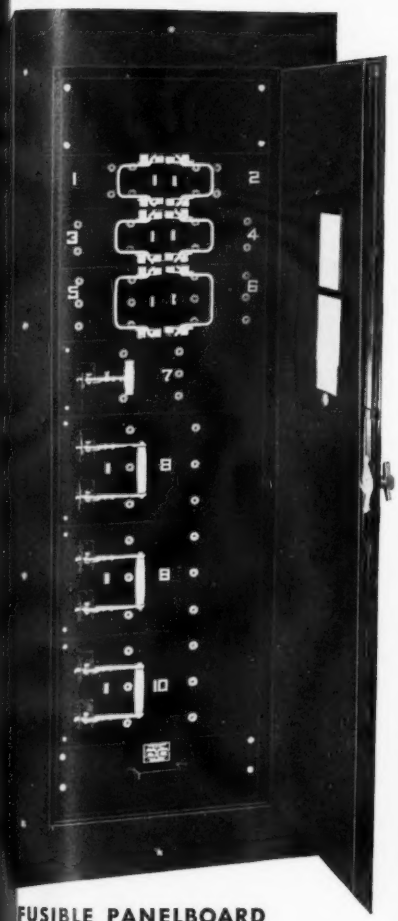
Less cost... Less space

WITH THE NEW SQUARE D MH MULTI-BREAKER PANELBOARDS



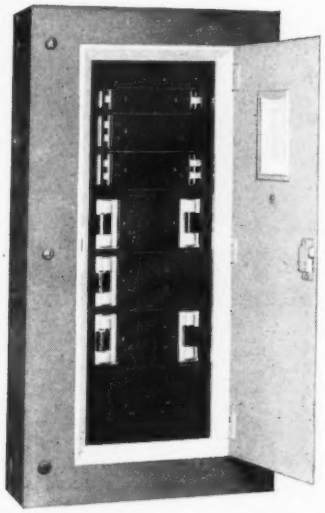
FUSIBLE PANELBOARD
Illustrated above is a standard fusible distribution panel for power and light.

COST OF 230-VOLT CIRCUIT BREAKER PROTECTION REDUCED SUBSTANTIALLY!

For a long time, plant engineers have appreciated the advantages of circuit breakers over fusible panels for the protection of power and lighting circuits. But—high cost has prevented many circuit breaker installations.

That price barrier has been removed! For 115 or 230 volt circuits, Square D now offers the new type MH Multi-breakeR Distribution Panelboards at drastically reduced costs. Prices are now comparable with fusible equipment.

But that isn't all. Space requirements have been reduced—tremendously. Contrast the size of the two panels illustrated—each does the same job. Even on new installations, space is usually an important factor. On rewiring jobs, the use of MH panelboard interiors in existing panel boxes will provide the additional circuits made possible by the use of the new thin wall wire.



NEW MH PANELBOARD
These two panels do the same job. Illustrations show comparable size. The MH takes just about half the space.

Breakers are furnished in 15 to 100 ampere capacities . . . 2 or 3 pole, for 115 or 230 volt, single phase and 3-phase A.C. systems. Since these breakers are common trip (an overload on any pole will cause all poles to trip), they are suitable for use in ungrounded and polyphase systems and cannot cause the single phasing of a polyphase circuit.

The panels are completely dead front—no live parts are exposed even when restoring service after an overload or short circuit. The simple rugged construction of the breaker units assures the same long life and trouble-free service which have made Square D Multi-breakeRs so outstanding.

For complete information, write for Bulletin 5200. See how little it costs to provide modern circuit breaker protection.

SQUARE D EQUIPMENT IS AVAILABLE THROUGH ELECTRICAL WHOLESALERS—EVERYWHERE

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Wiring materials are available in the G-E line for wiring factories, homes, stores, office buildings, apartment houses, etc. The line is complete. It contains the materials you need whatever sort of job you are about to handle.

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The quality of G-E Wiring Materials is uniformly high. They are easy to use and will give dependable service. Your customers are sure to be pleased.

Two manuals have been prepared which will be helpful in planning industrial wiring and residential wiring. Further information about G-E Wiring Materials is also given in the manuals. For copies of them, see the nearest G-E Merchandise Distributor or mail the coupon.

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- Small Circuit Breakers
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- Plugs, Caps, Bodies

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Sirs: Please send me ☐ the G-E Home Wiring Handbook ☐ Adequate Wiring for Industry

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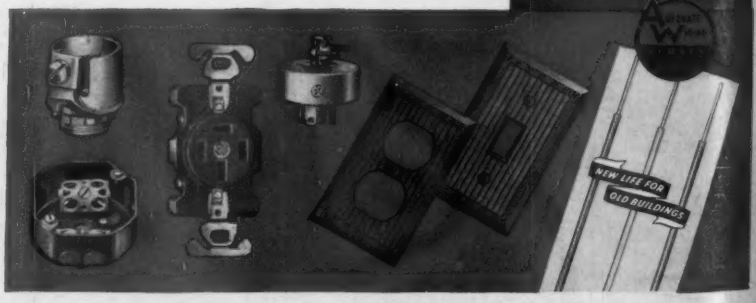

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